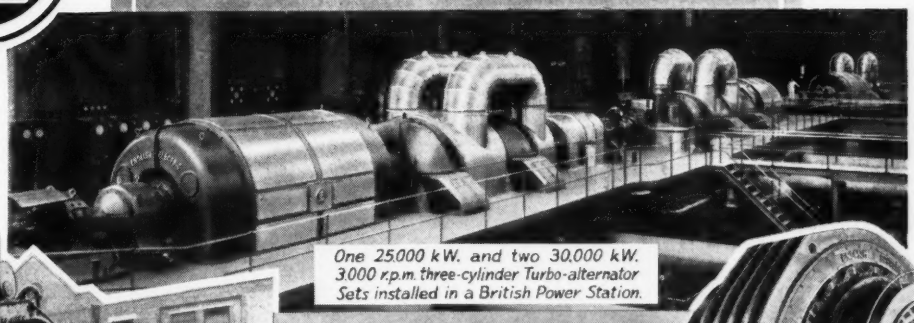
ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXVIII. No. 3296 JANUARY 24, 1941 SIXPENCE

Electrical Equipment



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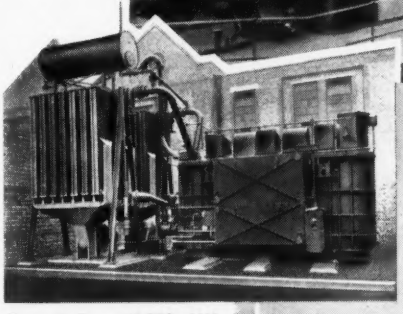

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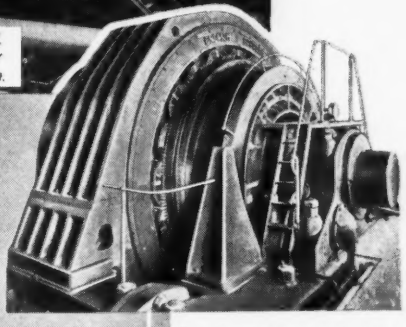

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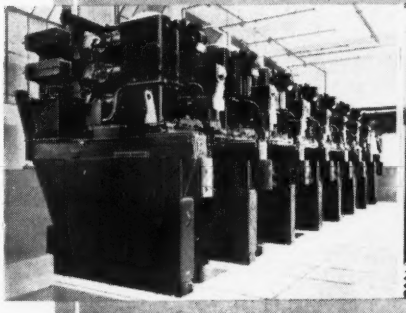

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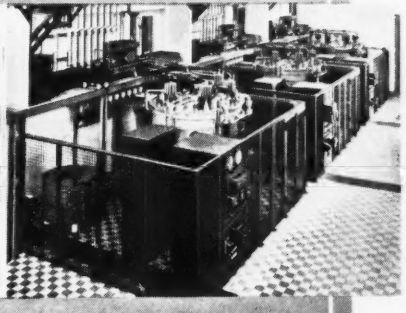

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THE
ELECTRICAL REVIEW

Volume CXXVIII — No. 3296

Friday, January 24th, 1941

Contents

	Page
Editorial—Taxation and Salaries	271
A Modern Dairy	273
Personal and Social	276
Manufacturing Activities	277
Circuit-breaker Calibration	279
Institution Proceedings	280
Electrically Driven Ships. By A. Regnauld, B.Sc., M.I.E.E.	282
New Books	283
Commercial and Industrial	284
New Electrical Products	286
Electricity Supply	287
New Patents	289
Financial Section	290
Contract Information	293
Classified Advertisements (Official Notices, Situations Vacant, etc.)	39
Index to Advertisers	56

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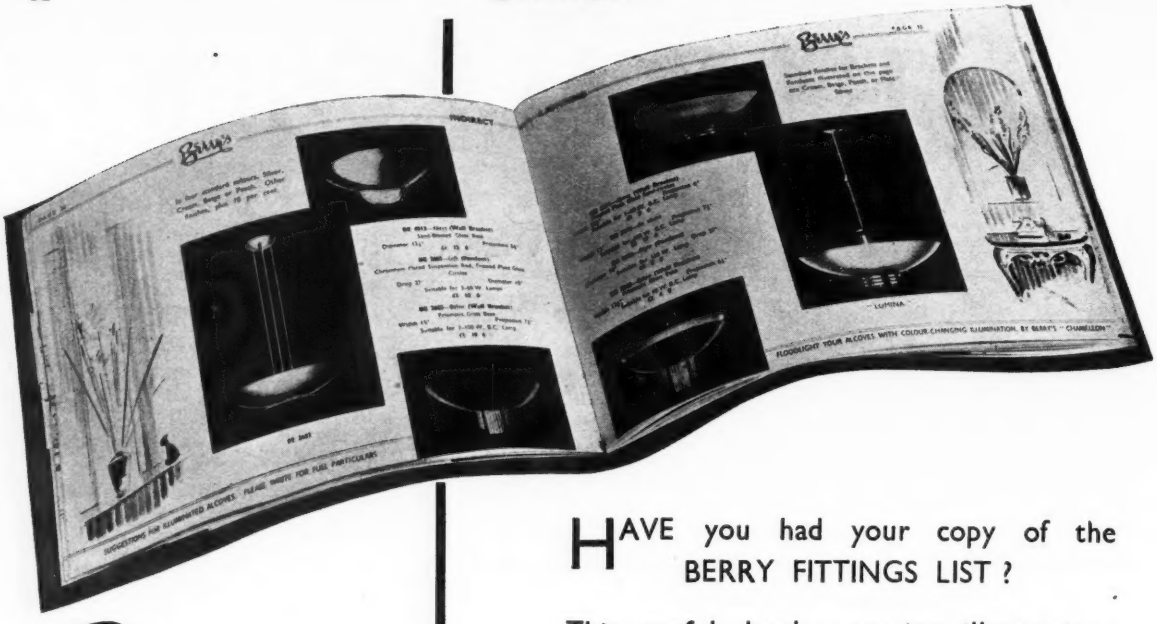

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THE
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THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXVIII. No. 3296 JANUARY 24, 1941 Price SIXPENCE

Taxation and Salaries

National Joint Board's Decision

INFLATION due to the " vicious spiral " of wages pursuing the cost of living on its upward flight is a danger feared by many economists. It is a danger which the Government is endeavouring to avoid by fixing the prices of essential commodities, even if it means subsidising the suppliers. But this is a policy which has definite limits, for too many subsidies mean additional heavy taxation and eventually the consumer is no better off than he was before.

This reference to taxation raises an interesting point which was embodied in a motion put forward by Mr. C. D. Taite at a recent meeting of the National Joint Board of Employers and Members of Staff (Electricity Supply Industry). Salaries of staff engineers are on a cost-of-living adjustment basis and in Mr. Taite's view it was inequitable that in the calculation of the cost of living the higher taxation should be included. He pointed out that, in effect, the employers were being asked to pay their employees' share of national taxation. As the employers cannot operate at a loss the burden would be passed on to the consumer who in the last resort bears any increase in production costs.

The staff side of the N.J.B. said that it needed time to study the proposal to exclude increased taxes from the calculations. In any case the inclusion of taxation was no new thing; all that had taken place since September, 1939, was an increase in taxation. One impost, the Purchase Tax, was an innovation but it was too early yet to gauge its effect upon commodity prices.

Creating a Precedent

Moreover, they said, there were in this country between two and three million workers whose wages were linked to the cost-of-living index; of these the technical staffs represented only about 7,000. They were loth to accept such a principle as that proposed as it might create a precedent which would be very unwelcome to other employees whose wages were based on the index.

It was considered that the Board should await an official pronouncement from the Government. The fact that, for the first time, the effect of taxation had been indicated seemed to show that the Government had something in mind. At a later meeting, however, the Board passed a resolution adopting Mr. Taite's proposal and the revision of salaries operative from January 1st takes account of this.

In the various branches of the electrical industry the rising cost of living has been met from time to time by the granting of increases, as has been the case in other industries. It is doubtful, of course, whether these advances have enabled wages to keep pace with the extra cost of commodities or whether any such process will succeed in this aim.

Workers and Consumers

It is necessary to bear in mind the fact that the recipients of the higher wages are largely ultimate consumers of goods so that, in effect, they are paying the increases themselves. Then, finding that they are no better off, they have to start again and so the endless process goes on. The unfortunate are those with fixed incomes and employees who are not able to insist upon higher wages and salaries. These find their position rapidly worsening as the cost of living soars.

Another thing which operates upon the cost of living is the scarcity of commodities which is due both to the natural effect of concentration upon war essentials and to the deliberate policy of the Government as manifested in the Limitation of Supplies Act. It may be asked with regard to the latter whether the rise in prices which must inevitably follow an excess of demand over supply shall be countered by wage increases to enable some sections of the community to buy what the Government considers should not be bought. And this consideration applies as well to the Purchase Tax which is designed equally to produce revenue and to cut down consumption.

It will be seen, therefore, that there is every justifica-

tion for ignoring taxation in calculating the rise of prices but the ascertainment of what part of the rise is due to this cause will be found a considerable task. However this may be, the decision of the N.J.B. will bring the matter forcibly before the attention of the Government, from whom we may soon expect a lead.

Indecision at Bradford

FOLLOWING upon an upheaval in the Bradford Electricity Department last year a Special Committee recommended that instead of a city electrical engineer and manager responsibility should be divided between an electrical engineer and a commercial manager. The retirement of Mr. Thomas Roles a few months ago left the field open and the Electricity Committee was instructed to advertise the posts. Later, however, it was announced that Mr. W. Dundas who was deputy to Mr. Roles had been appointed city electrical engineer. This was apparently a recommendation only, for when the matter went before the Finance and General Purposes Committee it was referred back to the Electricity Committee. When the City Council met last week it spent much time in debating the question whether, as now proposed by the Electricity Committee, the chief official should be designated "electrical engineer or manager" or whether the responsibilities should be shared equally between a city electrical engineer and a commercial manager. The Electricity Committee won and the position so far is that there shall be a city electrical engineer and manager with a deputy engineer and a commercial manager responsible to him for their particular branches.

Industrial Power

WARTIME needs have accentuated the important part which electricity plays in modern industry. In fact it is the development of the use of electricity which has been mainly responsible for the rapid advance in production. The necessity for bringing new units into operation in a matter of weeks rather than the months which are allowed in peacetime, and the re-equipment of older works to raise and speed up output has brought with it an intensified demand for industrial electrical gear. In our next issue we propose to review this subject by quoting examples drawn from various sections of the industry in an endeavour to show the prominent part which electrical manufacturers are playing in our gigantic war effort.

Ship Propulsion

IN its application to propulsion, whether on sea or on land, electricity provides, fundamentally, a means of gearing the prime mover to the load. Although regarded superficially, this gearing may appear to be more costly and inherently less efficient than its mechanical counterpart, advantage may be taken of the great adaptability of electrical methods in that its overall cost may compare favourably in many instances. For examples of how this works out in practice in regard to the propulsion of ships, we may refer readers to a paper presented by Mr. W. J. Belsey before the Institution of Marine Engineers earlier in the year. Even if cost comparison does not make a *prima facie* case for electricity, there are many other considerations, especially under war conditions, that would warrant its use. These are discussed by Mr. A. Regnauld in an article which appears in this issue. In normal times a straight commercial case has to be made out for the adoption of electricity in most applications, its other advantages (perhaps of greater importance ultimately) being regarded more or less as uncovenanted benefits. Under present circumstances when cost is not the primary consideration most emphasis should be laid on the special suitability of electrical methods for specific purposes.

Transport Peaks

As a result of longer working hours in factories, the load factor of electricity supply throughout the country as a whole has no doubt considerably increased. On the other hand it has worsened on local transport systems, owing to the tendency for urban travel to be concentrated in the daylight hours immediately after and immediately before "blackout." Thus the number of passengers carried by tramcars in Liverpool between 4 and 6 p.m. on a typical week-day is some 25 per cent. higher than it was over a similar period this time last year. The chairman of the Liverpool Passenger Transport Committee, Councillor C. W. G. Armour, stated recently that he expected that after the war those travelling to the centre of the City would be picked up from tramway routes (which would terminate outside the congested area) by light battery vehicles. These would have open sides in order to expedite the loading and unloading of passengers. In addition to the advantages they possess of silence and absence of exhaust fumes, such vehicles could operate on many roads not now served by public conveyances. Had they been in use to-day, the ability to charge the batteries off-peak would have greatly lessened any load-factor difficulties.

Women in Industry

A number of problems relating to the admission of women into the engineering industry were surveyed by Miss Caroline Haslett in a paper which she read before the Royal Society of Arts last week. Miss Haslett showed that it was easier to obtain female machinists and labourers than supervisors. The difficulty was to find women who were willing to spend time and money in training which is at least a matter of months. When dealing with the subject of simplifying work to bring it within the capabilities of women who were not fully trained, Miss Haslett used the term "deskilling." We do not accuse her of inventing this awful word but we would appeal to her not to give it currency. Too many of such neologisms, which do not decorate our language, are emanating from Government Departments nowadays.

Protest from Plymstock

FROM no less a place than Plymstock (Devon) comes support for our often-expressed condemnation of the practice of relieving the rates at the expense of electricity consumers. The Parish Council has passed a resolution on the subject and is sending a copy to the Electricity Commissioners. We feel, however, that the Commissioners will not be impressed by the statement of the mover of the resolution that "it had been decided many times in the law courts that such surpluses must be used for the benefit of the consumers, either in the way of reduced charges or for the extension of the system." This may be a consummation devoutly to be wished but we would not like to bear the expense of a test case.

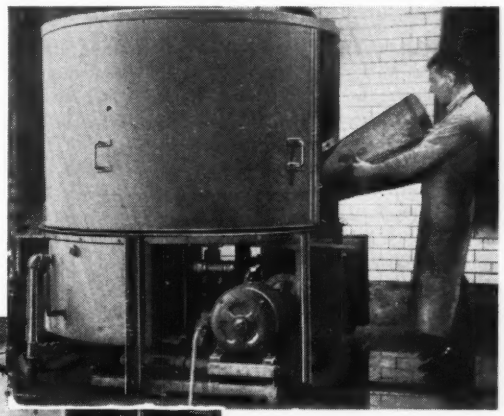
A Modern Dairy

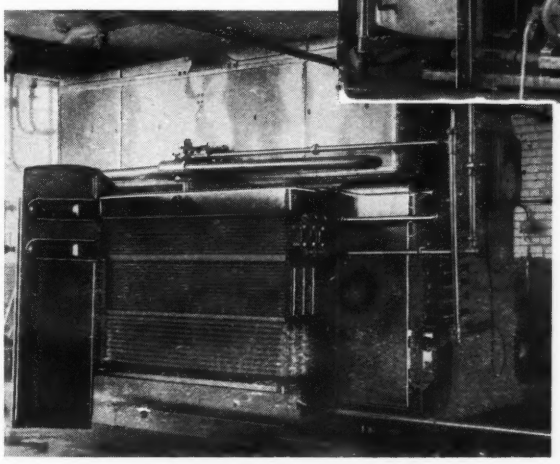
Electricity Ensures Hygienic Conditions

Besides considerably accelerating and simplifying the treatment of milk in a dairy, the use of electricity ensures a high standard of cleanliness not otherwise possible. In this article a typical up-to-date dairy installation at Stockport is described

MILK is one of our most important protective foods and, as such, deserves every precaution to ensure cleanliness. Electricity is practically synonymous for this very desirable attribute and its extensive use, therefore, is almost essential if it is to be achieved. The large number of ways in which electrical energy can be utilised in an up-to-date dairy is well exemplified at the new premises of the Stockport Co-operative Society, Ltd., where there are approximately twenty-seven motors, representing a total of 159 HP.

The dairy, which has been in operation since September last, is designed to handle 50,000 gallons of milk a week, but provision is made for easily increasing capacity when the necessity arises, ample space being provided for installing additional plant. With the exception of the heating of the very large amount of water required, practically every process is carried out electrically. A striking feature of the plant is that wherever possible apparatus has been provided in pairs. This arrangement Mr. H. S. Young, the manager, who was largely responsible for the scheme, tells us, is found to be most economical, for while being somewhat more costly than having single units of the same total capacity, it obviates the necessity for stand-by plant.





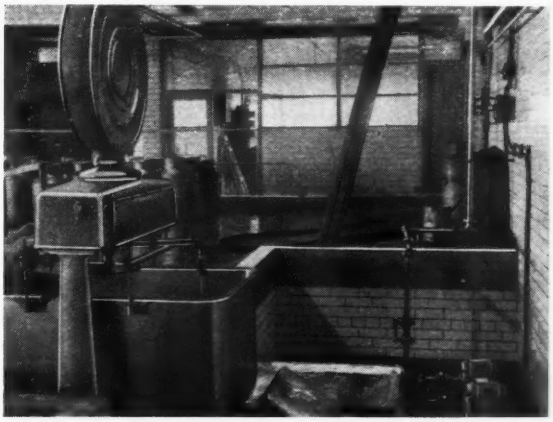
A rotary can washer and (left) a unified pasteuriser with the front opened to show the milk heating and cooling pipes

Brought to the building in cans from the unloading bay, the milk is taken to the receiving room, where it is tipped into a weighing machine. From here it is released into a tank and then taken by means of centrifugal pumps, which are in duplicate and are driven by 2-HP, 1460-RPM motors, to the pasteurisers, on the first floor. The empty cans are washed, at the rate of 118 per hour, in a rotating washing machine driven by a 3-HP, 1,460-RPM motor. The operation is entirely automatic, the steam and water inlets, as well as their temperatures, being controlled.

Pasteurising is carried out by two Graham-Enock "Gem" unified machines which are arranged in duplicate, and, as their name implies, cover the complete process from start to finish. This consists in first filtering the raw milk and then raising its temperature to exactly 146 deg. F, maintaining it for half an hour, after which it is cooled off as quickly as possible to about 40 deg. F.

Each machine can treat 660 gallons of milk an hour, the flow being controlled by a valve on the milk line. Entering the apparatus, the raw milk is taken to the regenerative section of the machine, where its temperature is raised to about 100 deg. F. by waste heat from milk already treated, passing over the pipes containing it, the warm treated milk thus at the same time undergoing the first stage of its cooling. This system is obviously very economical and results in a considerable saving both in heating and cooling costs.

Leaving the regenerative section the raw milk is heated slightly more by hot water to bring its temperature up to about 130 deg. during which process it is filtered. After being filtered the milk goes to the heater tubes where it is brought up to its maximum heat (146 deg. F) and then discharged into the holding vessels at the top of the apparatus, where that temperature is maintained for the required period of 30 minutes. The heater tubes are heated by hot water coils, the temperature being controlled and recorded by a Bristol instrument. From the holding vessel, which, like all the rest of the apparatus coming into contact with the milk, is of stainless steel, the milk is automatically discharged into the coolers. As is the case with the

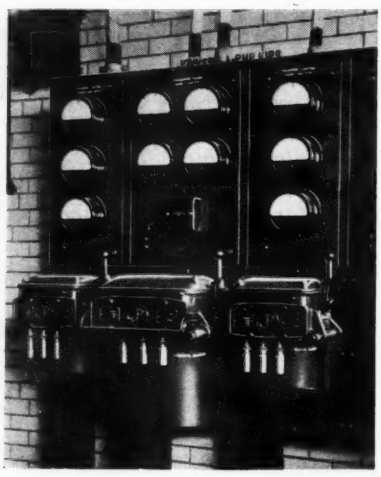


Milk weighing and pumping apparatus

heating up, the cooling process is in three stages, comprising regenerative, cold water and refrigerating sections. The various filling, holding and discharging stages are controlled by an electric motor suitably geared and arranged to operate the necessary valves, an electrically driven pump keeping a constant flow of hot water through the heat exchangers.

When the milk has been cooled and the pasteurising process thus completed, it is run into a " balance " or storage tank, where a paddle type agitator driven by a ⅓-HP, 1,425-RPM motor fitted with an Allen West starter, keeps it at a constant consistency preparatory to bottling.

The bottling equipment and bottle washing plant are synchronised and run as a single unit, bottles entering it at one end being washed, filled and capped by the time they reach the other. The washing machines are of the " Synchro " straight - through sprayer process type with automatic feed and delivery and, like the remainder of the plant, they are arranged in duplicate, each feeding two bottlers and aluminium cappers. The pumps for the sprayers are driven by 10-HP " Klosd " watertight motors, similar 2-HP units operating the conveyor which carries the bottles through the machine and discharges them on to the " Majonier " conveyors (driven by 2-HP motors) serving the bottlers.



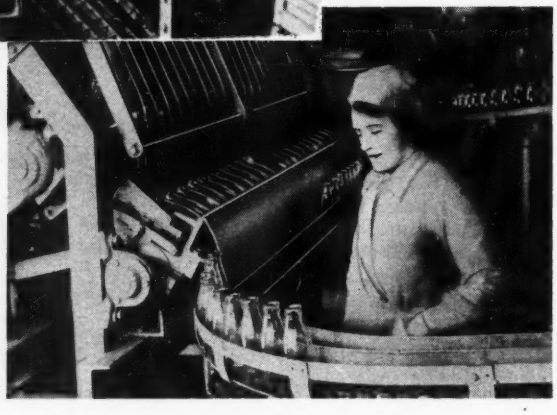
The main switchboard for the dairy

Each of the four fully automatic combined fillers and capping machines, independently driven by means of 1½-HP, 1,460 - RPM motors with Allen West starters, has a capacity of eighty bottles a minute, the whole plant therefore being able to deal with 320 bottles a minute. The caps are stamped out direct from aluminium strip.

The filled bottles are then placed to await dispatch in the cold storage room where the temperature is maintained at about 40 deg. F. by means of two air-conditioning units fitted with motor-driven fans. The necessary refrigeration for this purpose, as well as in connection with the pasteurising and bottle washing processes, is provided by means of two 5-inch twin-operated ammonia compressors driven through vee-belts by 30-HP, 1,440-RPM motors. " Teddington " motorised valves controlled by pressurestats regulate the flow of the ammonia, and thus the temperature, to the various plants. Control is entirely automatic by means of local thermostats operating in conjunction with a centralised contactor panel.

To furnish the large quantity of water required for bottling and churn washing, pasteurisation, etc., a 12-inch Sulzer borehole pump, driven by a 14-HP, 1,445-RPM motor, has been sunk 400 ft. This is capable of supplying 12,000 gallons per hour, its operation being automatically regulated by means of a Brookhirst control board functioning in accordance with the level of the water in a 50,000-gal. storage tank constructed under the platform of the reception and dispatch bay. Softening of the water, which helps considerably by increasing efficiency and reducing working costs, is effected by means of a base exchange plant, and two booster pumps are provided. The larger one, which is worked by a 10-HP motor, supplies water for general purposes throughout the building, while the smaller unit with a 3-HP motor serves the ammonia compressors when being used on automatic control.

Heating of the water is carried out by means of a Cochrane type boiler with a steam capacity of 6,000 lb. per hour and operating at a maximum pressure of 140 lb. per sq. inch. Working in conjunction with the boiler is an electrically driven " Iron Fireman " to supply the



Above : Air-conditioning plant in the cold room where milk is stored while awaiting dispatch. Left : Coating the bottles as they come from automatic fillers and cappers. Below : Clean bottles leaving one of the automatic washing machines

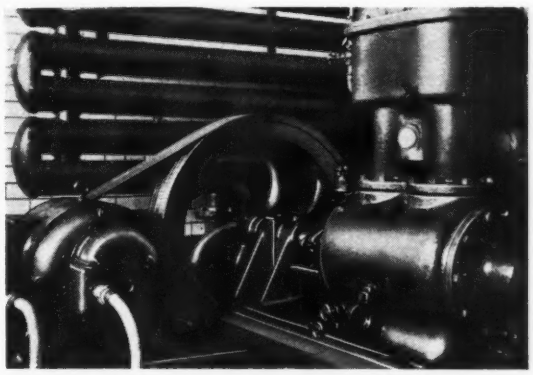
necessary forced draught. This is controlled by a pressurestat, which can be set to operate on any desired steam lag, two switches being set respectively for high and low lag. A Sangamo time switch, giving a specified blowing period each hour, permits automatic night firing without any attention. There is sufficient space in the boiler room for the addition of another boiler when it is needed at any future date.

For delivering some of the milk the Society employs twenty electric vehicles of various makes, ten of the four-wheeler type and ten of the pram type. The Westinghouse chargers for these are all conveniently installed under cover close to the dispatch section.

Before the milk leaves the building, and indeed, throughout all the various processes, a number of routine tests covering quality, cleanliness and bacteria content are undertaken to ensure that a high standard is maintained. A well-equipped laboratory includes among its up-to-date electrical apparatus a thermostatically-controlled cabinet for sterilising glassware, etc., such as test tubes, specimen plates and pipettes; a culture cabinet, also thermostatically controlled for incubating various bacteria cultures; a water bath operating at 37 deg. C. required in connection with the methylene-blue test for checking the keeping qualities of the milk; a centrifuge for testing the fat content; and an illuminated bacteria counting chamber.

Electric delivery prams on charge

To supply the necessary electrical power for the dairy, a high-voltage supply from the Cheadle and Gatley Electricity Department is stepped down to 400 V by means of a 250-kVA transformer. The main low-voltage metalclad switchboard (J. & P.) is divided into three sections covering the dairy plant, the charging equipment and the lighting, with the isolating links in a separate side panel. A G.E.C. transformer fitted in the pump room provides a 12-V supply for hand lamps all over the building.



One of the ammonia compressors

The electrical installation was carried out by William Percy, of Stockport, T. N. Robinson, Ltd., supplying a considerable amount of the electrical equipment. The whole of the dairy equipment, including the refrigeration plant, was supplied and installed by the Graham Enock Manufacturing Co., Ltd. Practically all the electric motors installed were made by Crompton Parkinson, Ltd.

Personal and Social (*Concluded from page 276*)

a rare capacity for making friends will be greatly missed by his many scientific and professional associates to whom he leaves a valuable contribution to research work on problems connected with earthing, overhead lines, and conductors. He became a cadet at the Royal Military Academy, Woolwich, in 1916–17 and later served with the B.E.F., France, and on the North-West Frontier of India.

Alderman James H. Willis, whose death occurred in the West Hallam Hospital, West Bromwich, on January 12th, was well known in the electrical industry in the Midlands. He was chairman of the West Bromwich Electricity Committee, a member of the Midland Joint Industrial Council and Standing Committee, the National Council for the Electricity Supply Industry and its executive and employees' representative on the North West Midlands Joint Electricity Authority.

Alderman Willis had been a member of the West Bromwich Town Council for twenty-one years.

Mr. Walter Baker, aged sixty-five, formerly manager of the installation department of Burnley Corporation Electricity Department, who retired last year, was interred on January 9th.

Mr. W. H. Haslam, of Mickleover, whose recent death is announced at the age of sixty-one years, was a well-known Derby electrical engineer. For many years he carried on business in St. Helens Street and Iron Gate, Derby, and eventually became works manager for Batterby and Hefford, electrical engineers, Derby.

Mr. R. Adams.—The death is reported, at the age of 71, of Mr. Robert Adams, A.R.C.Sc., a former senior examiner in the Patent Office.

Mr. G. H. Bastin.—The death has occurred of Mr. George H. Bastin, aged 50, at his home in Cheltenham. Mr. Bastin, who leaves a widow, joined his father's electrical business after the last war. The Cheltenham Circle of the E.D.A., formed in 1929, elected Mr. Bastin as chairman, and he held this office at the time of his death.

Mr. A. E. Arnold.—The death recently occurred of Mr. Albert E. Arnold, who was in charge of the Stafford substation of the North-West Midlands Joint Electricity Authority.

Mr. C. T. Holland.—The death occurred last week of Mr. Charles Thurston Holland, F.R.C.S., at the age of seventy-seven. Mr. Holland was one of the earliest workers in the application of X-rays in medical and surgical work and his activities secured for him an international reputation. He was the president of the first International Congress of Radiology which was held in London in 1925.

Lord Wakefield, whose death occurred on January 15th, was founder and governing director of C. C. Wakefield & Co., Ltd.

Mr. P. H. Naftel.—The death has occurred at Bedford of Mr. Percy H. Naftel, who, until his retirement in 1925, was for many years installation engineer to the Liverpool Electric Power & Lighting Department. He was eighty-one.

Mrs. Garsden.—We regret to record the death of Mrs. Jessie Garsden, wife of Mr. J. W. Garsden (Ediswan Manchester depot manager) and a prominent member of the Electrical Association for Women. Mrs. Garsden was buried at Blackburn Cemetery following a funeral service at St. Silas Church which the mayor and deputy-mayor of Blackburn attended.

Mr. J. Brown.—The death occurred at Greenock on January 14th of Mr. James Brown, C.B.E., for many years managing director and deputy chairman of Scott's Shipbuilding & Engineering Co., Ltd. He was 79 years of age. Mr. Brown was an expert both in steam and Diesel machinery and played a part in the design of the first Diesel-electric installations ever built in this country for marine work.

Mr. R. Stringer, of Burnage, Manchester, whose death has occurred at the age of sixty years, conducted an electrical business at Plymouth Grove, Longsight. for many years. He specialised in medical electrical apparatus, and was responsible for installations in a number of hospitals in Manchester.

Mr. Edward Hickman, of Tettenhall, Wolverhampton, whose death occurred recently at the age of eighty years, was for a long period associated with Alfred Hickman, Ltd., of Bilston. He became chairman of directors in 1910, but retired from commercial life when the business was amalgamated with Stewarts and Lloyds, Ltd., in 1920. He was the eldest surviving son of the late Sir Alfred Hickman, Bt., who founded the original business in 1867.

Mr. I. S. Mackenzie.—The death is reported of Mr. Ian Scott Mackenzie, M.I.E.E., of Roydon, Ware.

Wills.—**Mr. D. Roberts,** a director of Towyn & Aberdovey Electricity Co., left £8,211 (net personalty £5,521).

Mr. C. S. Davy, a former director of Babcock & Wilcox and the Stirling Boiler Co., left £13,788 (net personalty £12,111).

PERSONAL and SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

As we reported in our last issue, **Mr. G. H. Pulfrey** has been appointed general manager and engineer of the Hull transport undertaking. Mr. Pulfrey was educated at Sheffield University and served an indentured apprenticeship with Mr. A. R. Fearnley in the Sheffield transport department and then received a general training at the head office of the department, later being appointed technical assistant in the drawing office. Two years later he became chief assistant engineer on the tramways side and in a further two years was promoted to the position of engineer in charge of motor buses and garages.

Mr. G. H. Pulfrey

He left Sheffield in 1935 to become rolling stock engineer at Nottingham, where his principal activity was in connection with the conversion of the tramways to trolley-bus and motor-bus operation and the modernisation of the system. He went to St. Helens in 1939 as general manager of the Corporation transport department and was soon involved in adapting the system to wartime operation, and looking after such matters as the bulk storage of petrol for the Corporation's services, the organisation of the town's ambulance services, etc. Mr. Pulfrey is a member of the Institute of Automobile Engineers and of the Institute of Transport.

Mr. H. J. Gibson, the new manager of the Kidderminster district of the Shropshire, Worcestershire and Staffordshire Electric Power Co., took up his duties on January 1st. Mr. Gibson, who succeeds **Mr. E. E. Hamer,** who has left the company, has been with the company for eleven years, latterly as deputy distribution engineer at the Central Office, Mucklows Hill. A regrouping scheme has been carried out whereby the districts centring at West Hagley, Bromsgrove and Redditch are to be administered from Kidderminster, so that Mr. Gibson's dual capacity is that of district manager and divisional manager.

The inauguration of an annual luncheon is announced by the West Yorkshire Committee of the Electrical Industries Benevolent Association. This year's event is to be held on January 29th, at the Hotel Metropole, Leeds, the guest of honour being **Mr. P. V. Hunter,** M.I.E.E., the president of the Association. It is hoped that this courageous move will receive enthusiastic support. Tickets can be obtained from the Committee's honorary secretary, Mr. H. Peters, 46, Wellington Street, Leeds.

Lieut.-Colonel Lord Dudley Gordon, D.S.O., president of the Federation of British Industries, was at a recent meeting of the Grand Council, nominated for a second year of office. Lord Dudley Gordon, who is chairman of J. & E. Hall, Ltd., is a former president of the British Engineers' Association.

It is announced that **Admiral H. W. Grant,** C.B., has been appointed chairman and managing director of the Marconi International Marine Communication Co., Ltd. Admiral Grant's appointment as chairman and managing director of Marconi's Wireless Telegraph Co., Ltd., was reported in our issue of December 27th. With these appointments, Admiral Grant also assumes the direction of all the Marconi subsidiary companies. In March, 1918, he joined the Eastern Telegraph Co., was placed on the board and made managing director. He was later appointed to the boards of all the cable companies associated with the Eastern Telegraph Co. Admiral Grant is still a director of Cable and Wireless Ltd.

Mr. W. J. Lee, previously assistant meter superintendent at the St. Pancras Electricity Department, has been promoted to power station superintendent, as from November 1st, 1940, at a salary of £608, rising to £638.

Mr. George Bannister, a jointer in the employment of the Hastings Electricity Department, is retiring on account of ill-health after nearly forty years' service. A presentation, consisting of an electric clock, cigarettes and an electric table lamp for Mrs. Bannister, was made by Mr. A. J. Ryan, the borough electrical engineer, recently.

Mr. S. Raynor, assistant chief electrician at Markham Main Colliery, Yorkshire, has been appointed chief electrician in succession to **Mr. J. Pilkington.**

Professor Dr. Aurel Stodola, of Zürich, has been awarded the James Watt International Medal by the Institution of Mechanical Engineers. To-day (Friday) at a special meeting of the Institution the medal will be received for Professor Stodola by the Swiss Minister in London.

Mr. J. M. Beck, deputy electrical engineer with Wigan Corporation Electricity Department, has resigned owing to continued ill-health. The Electricity Committee has appointed **Mr. D. H. Winstanley,** station superintendent, to fill the vacancy.

York Corporation Electricity Department has appointed **Mr. H. A. Wadeson,** of Preston, as mains assistant.

Mr. F. Selley, borough electrical engineer and manager of St. Marylebone Electricity Department, who was to have retired at the end of the year, has agreed to continue for a further twelve months.

Mr. F. C. Morris, who recently retired after fifty years' service in the installations and mains department of the Sheffield Corporation Electricity Department, has been presented with an electric clock, suitably inscribed, from the staff and his fellow workmen.

Mr. C. G. D. Jackson, deputy general manager of the Liverpool Corporation passenger transport undertaking, has resigned. He has suffered from a breakdown of his health since July last, and is at present living at Rhyl. Mr. Jackson has been in the service of the Department for forty years.

Mr. S. E. Britton, engineer and manager of the Chester electricity undertaking, whose impending retirement was discussed at the last meeting of the City Council, has sent a letter to the Town Clerk pointing out that the resolution of the Council accepting his offer to serve for a further period does not enable him to surrender a part of his pension, subject to proof of good health, etc., and thereby arrange a pension for his wife at his death. He adds :—

"Having regard to the terms of the Superannuation Act, I should very much prefer to take my superannuation on the date on which it becomes due, viz., 11th April, and I would be willing to accept a suitable annual retaining fee, in addition to my pension, as remuneration for my services instead of a salary of £1,250 per annum."

Leeds Corporation Electricity Committee has appointed **Mr. T. Hewson** as senior charge engineer.

Capt. Keith H. Vignoles, of the Intelligence Corps, younger son of Lieut.-Col. W. A. Vignoles, D.S.O., managing director of Evershed and Vignoles, Ltd., was married at Cheltenham College Chapel recently to Miss Phyllis Mary Pearson.

Mr. H. R. Short, A.M.I.E.E., a member of the staff of the English Electric Co., Ltd., at Sheffield, was married recently to Miss Stella M. Stanton, of Chesterfield.

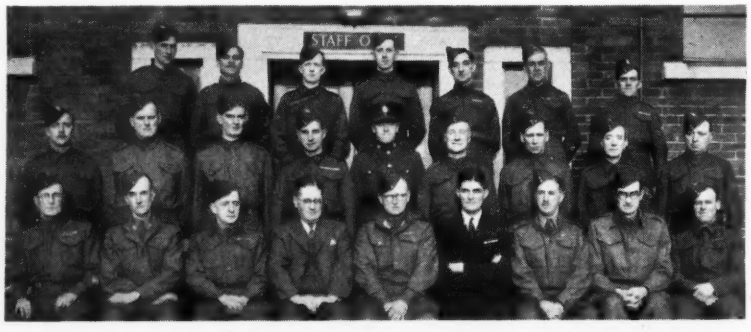
Mr. S. Johnson, section engineer to the Central Electricity Board, was married at St. Elizabeth's Church, Eastbourne, on January 16th, to Miss V. Jenkins.

Obituary

Mr. J. W. Hampsheir, of Redcliffe Gardens, Ilford, whose death occurred on January 9th, was general manager and director of Keith Blackman, Ltd. He was seventy-one years of age, and became associated with the company forty-eight years ago. He was appointed secretary thirteen years later, and became general manager in 1925.

Lieut. W. D. Tuck.—We regret to learn of the death through enemy action of Lieut. W. D. Tuck, A.M.I.E.E., a member of the E.R.A. staff, whose death in the Dunkirk operations is now confirmed. Lieut. Tuck's sound technical qualifications combined with

(*Concluded on page 275*)



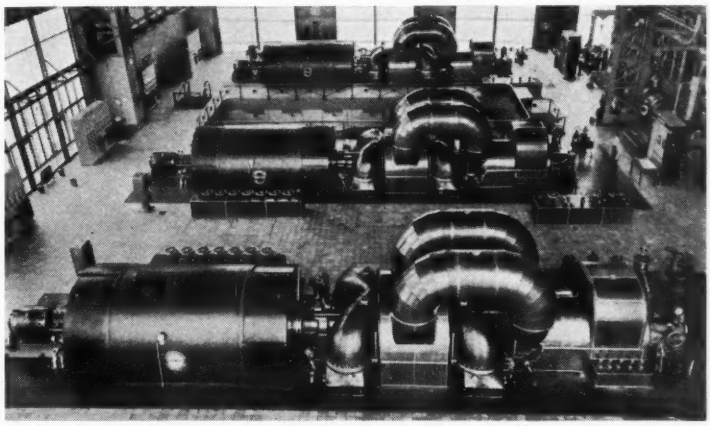
Some of the staff of the Blackburn Corporation who are members of the Home Guard. Mr. R. H. Harral (engineer and manager) and Mr. G. H. Sammons (deputy engineer) are in the front row in civilian dress

Manufacturing Activity

Salient Developments in 1940

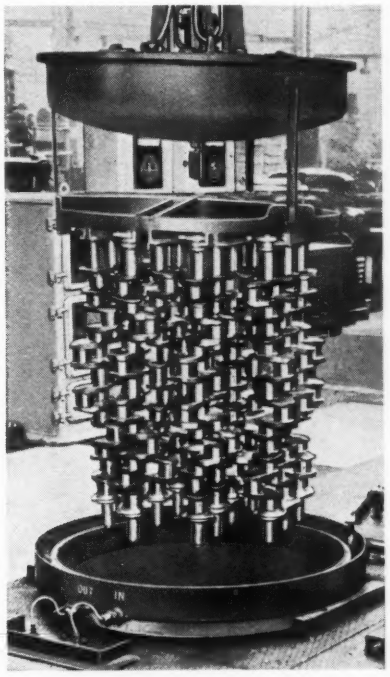
APART from meeting the heavy calls made by the fighting services on the resources of British electrical manufacturers during the past twelve months, the carrying out of orders of a more usual kind would have been enough to keep most sections of the works fully occupied. From particulars received from various firms we have selected a few examples that are typical of present progress.

On the heavy engineering side, a great number of turbo-alternators (a good proportion generating at 33 kV) are under construction or have recently been put into service. Among those of larger output, upwards of 20,000 kW, the Metropolitan-Vickers Electrical Co. is responsible for thirteen and C. A. Parsons & Co. and the British Thomson-Houston Co. for ten each; the English Electric Co. also has a considerable number of orders in hand.



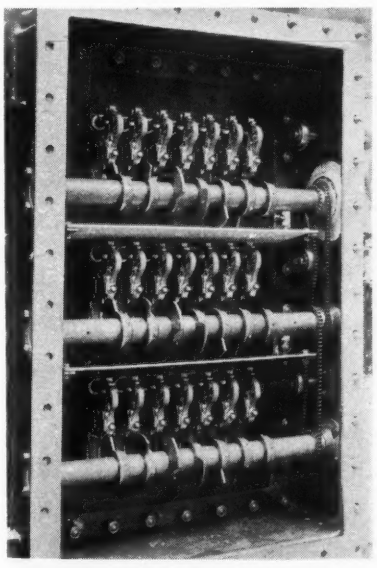
Three Parsons 40,000-kW, 3,000-RPM turbo-alternators in a South African power station

Included in the half-dozen Met-Vick turbo-alternators ordered from abroad are the three 20,000-kW units for the entire 60,000-kW generating station to be provided for Turkey, the condensing plant for which (as for all other sets made during the year) will be built by the company. Half of the Parsons units are in fulfilment of export orders; these cover the putting into commission of a second 50,000-kW, 3,000 RPM set for the Sydney County Council and a third 40,000 kW set for South Africa which, with a fourth now under construction, will run at the same speed. Products of the same concern are two 53,500-kW, 1,500-RPM turbo-alternators for a large home power station, the odd 3,500 kW being accounted for by a house alternator on the same shaft line. Orders have been received by the Brush Co. for a 50,000-kW and a 37,500-kW Ljungstrom turbines, the latter a repeat order from another British power station.

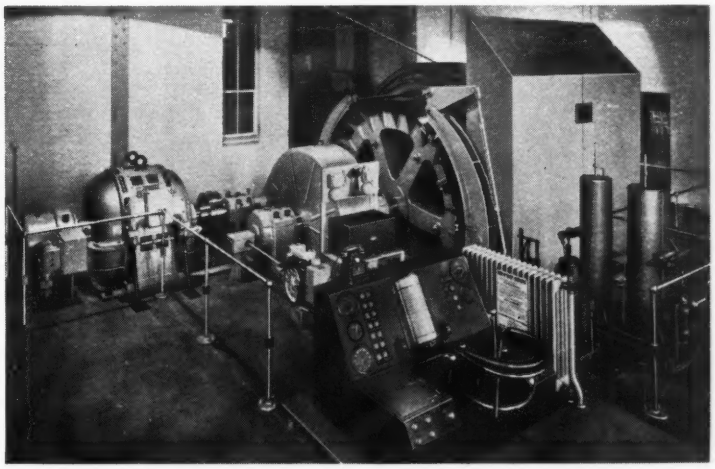


Right: A G.E.C. cylindrical furnace for stabilising and nitriding crankshafts

In individual output, the largest last year was a B.T.H. set of 60,000 kW for a station in England. Three large English Electric turbines are being built for steam conditions of from 1,200 to 1,300 lb. per sq. in. and 900 to 950 deg. F. and four for 650 lb. and 900 deg. In addition to the above, a large number of smaller sizes are also being built by all the companies, both direct-coupled and geared and for straight-condensing or pass-out operation. In some cases reconstruction was called for, as in the case of a 15,000-kW set for 50 cycles by Parsons and in another

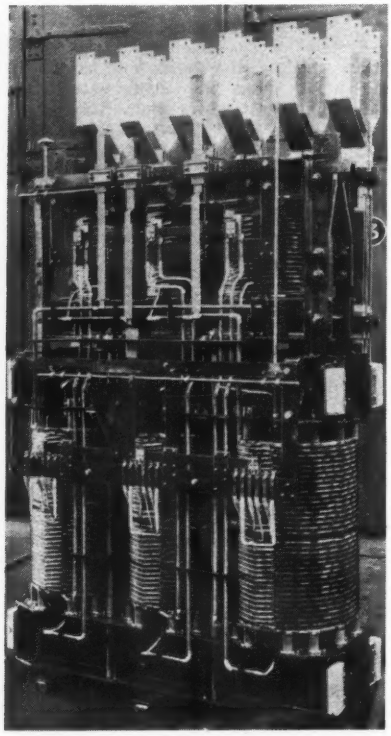


Left: Ferranti contactor type on-load tap-changing gear. Below: Met-Vick AC winder with quick-acting compound brake



of the same size by Richardsons, Westgarth & Co. which involved adding a high-pressure cylinder to an existing cylinder machine and giving it two bleeding points for supplying steam to a two-stage feed-heating system supplied by the company.

A number of contracts for complete hydro-electric generating units (mostly for export) were obtained by the English Electric Co.; these range in size from 17,600-HP horizontal impulse machines for high heads to a 2,850-HP horizontal reaction turbine for low head, both types running at about 500 RPM Some Met-Vick

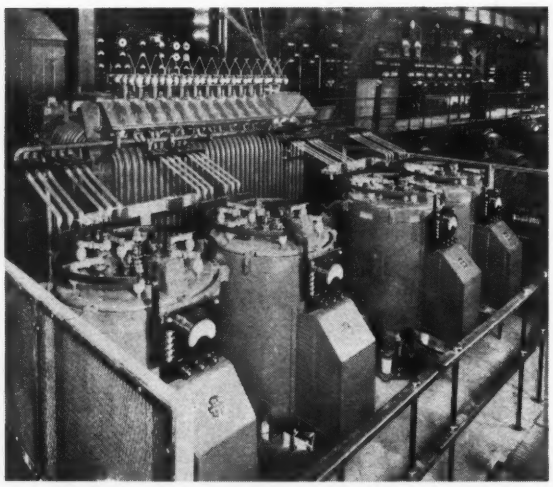


A Bruce Peebles 750-kVA, 10,750/120-90-V furnace transformer for New Zealand

salient-pole alternators of up to 24,000 kVA are intended for hydro-electric stations in New Zealand, three being of 19,000 kVA and running at 500 RPM, which is a high speed for vertical shaft machines of that output.

There seems to have been no diminution in the demand for transformers. Two 87,000-kVA, 11/66-kV, three-phase units are being built by Ferranti's for a British supply undertaking, five 40,000-kVA 10/88-kV three-phase banks for the Victoria Falls Power Co. and 20,000 and 10,000-kVA, 110-kV banks for New Zealand. Ferranti's have also completed two more 45,000-kVA, 132-kV transformers for the Central Electricity Board. This concern has now extended its simple method of on-load tap changing by means of contactors to larger kVA ratings.

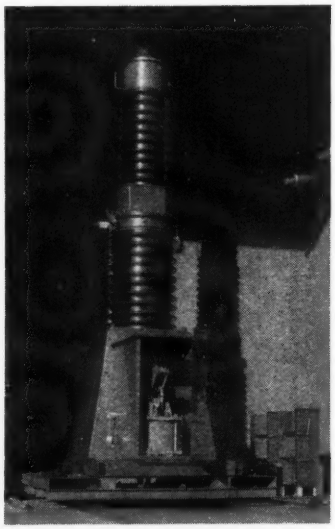
Other large transformers under construction are several up to 66,000 kVA by the Metropolitan-Vickers Co., including two of 30,000 kVA, 132 kV, for the C.E.B., and up to 30,000 kVA



B.T.H. pumpless rectifiers with DC output of 1,500 kW at 3,000-V in a railway substation

by the English Electric Co., which reports a good demand for small transformers for 33 kV also. The General Electric Co., Ltd., is manufacturing large high-voltage transformers for transmission schemes in New Zealand. Of the Parsons output the most notable are three 36,500-kVA and two 15,000-kVA units. Outstanding among the Bruce Peebles products are two of 25,000 kVA for the C.E.B. and two 15,000 kVA and two 10,000 kVA through-put regulating transformers. In common with the other manufacturers mentioned this company is actively engaged in producing smaller transformers for places abroad.

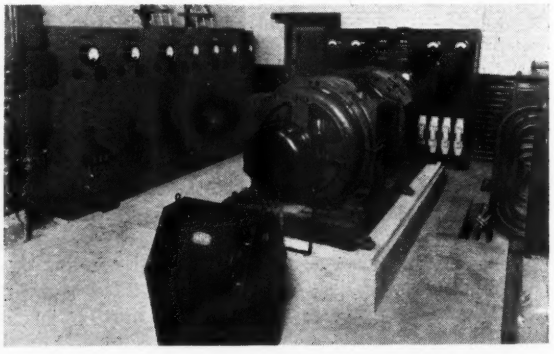
The present need for high-quality steels is reflected in the number of furnace transformers under construction by the various concerns, the B.T.H.



English Electric 132-kV oil-poor circuit-breaker, 1,500-MVA breaking capacity

Co. having recently finished one rated at 8,340 kVA. "Permitol" non-inflammable dielectric is being used for 1,000-kVA and 500-kVA transformers where the fire hazard justifies its extra cost. The B.T.H. Co. is also constructing a large number of transformers with shielded high-voltage windings for withstanding surges. The same problem is tackled by Ferranti's by means of their own stress-control system. Among the regulating equipment produced, are two Met-Vick 15,000-kVA three-phase shunt reactors designed to correct leading power factor at light load on the 132-kV grid.

For conversion to DC, the G.E.C., B.T.H. and English Electric have on the stocks a larger assortment of air-cooled pumpless mercury-arc steel rectifiers. The B.T.H. Co. is also building heavy-currrent water-cooled rectifiers with pumps including several with grids for arc suppression (leading examples of which are those up to 2,500 kW for South Africa) as well as glass-bulb



Brush equipment in a British engineering works

rectifiers up to 1,000 kW at 230 V and up to 120 kW at 12,000 V for radio transmitters. At Bruce Peebles' works rectifiers share the honours with motor convertors, which are being produced with outputs up to 1,500-kW, including one for India.

A steady demand is being maintained for switchgear of all standard voltages up to 132-kV, mainly of the medium-voltage metal-clad type. A new design developed during the year by Metropolitan Vickers has a short-circuit rating of 25 MVA at 400 V and current ratings of from 400 to 1,200 A. For high voltages the B.T.H. Co. has introduced a 750-MVA single-busbar oil-filled outdoor metal-clad design for 33 kV and another, more compact, of 1,500 MVA with double-busbars for indoor use. The same concern has improved its controlled-arc circuit breakers

by the provision of pneumatic operation and explosion chambers; the oil content is 4½ gal. for ratings up to 1,000 MVA at 11 kV and 10½ gal. for 1,500 MVA at 33 kV. The English Electric Co. is also developing oil-poor breakers with a maximum of 1,500 MVA at 132 kV.

Reference has been made above to the heavy demand for induction furnaces. One of the chief requirements to be met is that any one of many individual furnaces may be connected to the high-frequency supply. For this purpose a system of motor-operated switching has been evolved by the Met-Vick Co. There has also been an increase in the number and type of resistance furnaces installed. Some of the roller-type for bright-annealing cold-rolled strip, the General Electric Co. states, are 200 ft. in length, while some of those for the heat treatment of aluminium in rolled and extruded sections are 65 ft. The vertical cylindrical furnace has been applied to the stabilising and nitriding of crankshafts, reducing distortion and giving uniform hardness. A new electrode salt bath for the hardening of high-speed tool steels without scaling or decarburisation has been introduced by the G.E.C.; this is also being used for brazing high-speed steel and tungsten-carbide tips on medium-carbon steel shanks. A "Torribar" flexible heating unit has been developed by the B.T.H. Co. for general application.

Advances in electric welding in the past few months include increased kVA capacity of spot-welding machines and shaped electrode arms and tips, as exemplified in a 75-kVA machine for the spot welding of long narrow box sections by Met-Vick, which has also introduced a half-cycle Thyratron control panel for delicate work. The company informs us that automatic welding in both arc and atomic hydrogen processes is going ahead rapidly and that the demand for automatic electrodes is the heaviest yet experienced. The B.T.H. Co. draws attention to the advantages of ignition "woodpecker" control of resistance welding and to an extension of the timing range of Thyratron control of welding contactors with improved accuracy.

As might be expected there is considerable activity in the production of motors of all sizes, DC as well as AC. The most striking examples of the heavier type are generally to be found in collieries and in steel works, a large number of which are in course of manufacture. A considerable proportion of the former is destined for the Dominions, such as the winder equipment built by the B.T.H. Co., which incorporates two direct-coupled DC motors giving an RMS output of 4,380 HP (11,100 HP peak), and one by the Met-Vick also for South Africa which includes a 2,400-HP Ward-Leonard set.

Similar important orders have also been secured by the English Electric, as well as for rolling mills of many different types which have also given first-class opportunities to the two other companies mentioned and also to Bruce Peebles. The last named received a repeat order for nine 1,900-HP slow-speed synchronous-induction motors and the Metropolitan-Vickers Co. another for two 5,000-HP, 1,500-RPM induction motors.

Lighting, ventilation and heating have provided three major subjects for the attention of the General Electric Co. An important development has been the 5-ft. 80-W "Osira" fluorescent discharge tube, giving very nearly daylight illumination, which is also produced by the "Cosmos" lamp department of the Metropolitan-Vickers Co. and by other concerns. The G.E.C. is manufacturing for Baghdad an automatic telephone exchange for 10,400 subscribers. A timely introduction by the same concern is an electric "Life-Light" to take the place of calcium flares, especially on oil tankers and Diesel ships; it is fitted with a 3.5-V 0.3-A "Osram" bulb and two 1½-V cells of either the dry or the inert type.

Circuit-breaker Calibration

A New Testing Set

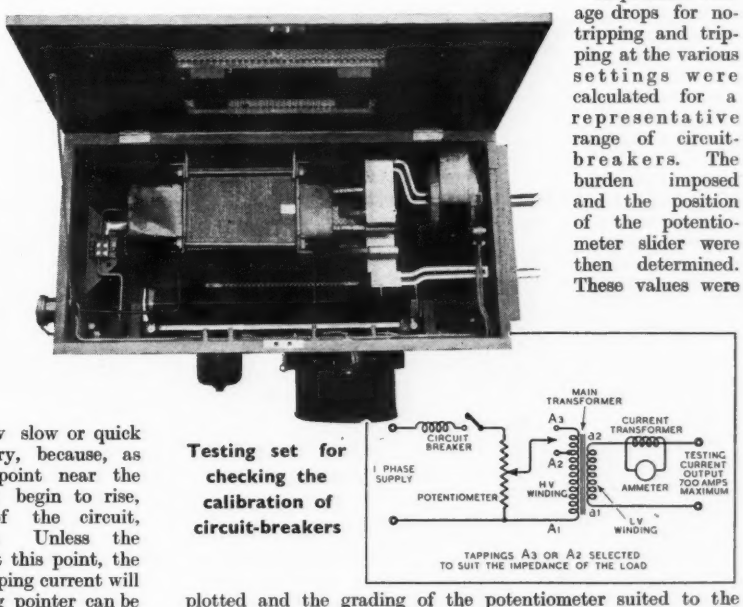
FULL compliance with the Electricity Supply Regulations, more particularly those sections numbered 7 (iii), 24, 25 (a) and 30 (ii), entails periodical testing of the tripping current of the circuit-breakers controlling the supply to a consumer's installation. This implies the recording of test results.

The testing set illustrated has been designed by Johnson & Phillips, Ltd., for checking the calibration markings of high- or low-voltage switchgear by circulating currents of up to 700 A through the circuit-breaker contacts and series overload coils or current transformer primary windings. It consists of a single-phase air-cooled shell-type transformer, wire-wound potentiometer for controlling the testing current, ring-type current transformer and large-scale ammeter for measuring the testing current, primary circuit-breaker and plug-and-socket connection for the leads.

The secondary leads are brought out in the form of busbars. The weight of the set complete in teak cabinet is 140 lb. which permits of its being handled by two persons. The set is intermittently rated, the duty cycle being one minute on, followed by a cooling period of five minutes. The potentiometer has a slider control to allow slow or quick adjustments to be made. This is necessary, because, as the current is raised steadily, at some point near the tripping current, the solenoid plunger will begin to rise, causing an increase in the impedance of the circuit, with a consequent decrease in current. Unless the applied voltage can be raised fairly rapidly at this point, the solenoid will chatter, and a definite value of tripping current will be difficult to obtain. A maximum indicating pointer can be fitted on the ammeter in order to avoid strain on the operator due to continuous scrutiny of the ammeter scale and to leave a record of the maximum current attained.

For a given current the load impedance can vary widely, depending upon the size of circuit-breaker. For example, a 250-A circuit-breaker tested at 500 A will have quite a different impedance voltage from that of a 500-A circuit-breaker tested at the same current, and the positions of the potentiometer slider will be different. Again the drop across a series overload coil immediately before tripping may be increased threefold, and a circuit-breaker may have to be tested for tripping at 50 per cent. overload when voltage drops in the two cases are different.

Impedance voltage drops for no-tripping and tripping at the various settings were calculated for a representative range of circuit-breakers. The burden imposed and the position of the potentiometer slider were then determined. These values were plotted and the grading of the potentiometer suited to the maximum ordinates of the curve so obtained.



Testing set for checking the calibration of circuit-breakers

A tapping on the transformer primary winding raises the output voltage by 10 per cent. in order to provide a margin of secondary voltage to cater for varying impedance voltages in different makes. Many different grades of resistance wire are employed in the potentiometer to prevent its being worked at a position in which regulation would be coarse.

INSTITUTION PROCEEDINGS

Cathode Rays in Welding. Alloys for Contacts. Radio Receiver Progress

In this section we include two I.E.E. papers which have just been circulated for written discussion—one on contact materials and the other reviewing developments in radio receivers during the past ten years or so. Miss Haslett has spoken on the admission of women into the engineering industry, and the use of a cathode-ray oscillograph in the study of spot welding has been dealt with by Mr. R. F. Tylecote in an Institute of Welding paper.

Spot-Welding Control

A CATHODE-RAY oscillograph for employment in spot welding research is the subject of a paper illustrated with circuit diagrams by Mr. R. F. Tylecote (Welding Research Council) which has been circulated by the INSTITUTE OF WELDING. It is pointed out that in the case of light alloys the duration of a spot weld varies between one-hundredth and one-half second, according to the material and its thickness, while the secondary peak current may exceed 100,000 A. The magnitude and short duration of the operation render it difficult to measure the quantities involved.

The author's purpose is to indicate the versatility and ability of the oscillograph to present a complete picture of both current and time as well as other variables, although he considers the apparatus to be somewhat complicated and costly. The cathode-ray type of instrument is preferred because it is easy to adjust and operate, the beam having hardly any inertia. A three-element oscillograph is used. One element determines the current common to both welding contacts, the other two measuring voltages across the inter-sheet contact and across the electrode-to-sheet contact. These three sets of data, each consisting of several cycles of sinusoidal wave form, permit investigation of the contact resistance of any point on any cycle, by plotting change of resistance with time.

The open-circuit voltage of a spot welder of the type used for light alloys averages 8 V. The closed circuit value is considerably less; actually 0.3V across the voltage elements and 0.7 V across the shunt makes it necessary to employ single-stage amplifiers with a gain of about 100 in order to get reasonable pictures with 700 V on the anodes, which means a sensitivity of about 0.5 mm. per V. This is a compromise, since sensitivity is reduced by anode voltage increase, which is needed to improve spot brightness for photographic recording.

The author's records indicate a very large fall of resistance during the first half-cycle of welding current, after which various changes occur due to temperature and modification of size of the weld. The large initial change denotes the breakdown of the contact resistance of the oxide film, which is sometimes brought about by pressure alone before the current is switched on. The voltage between the sheets during the first half-cycle rises very steeply to the point at which the dielectric property of the oxide films breaks down, causing a sudden fall of voltage before it rises again slowly as the sine wave form is restored.

Absorbing Women into Industry

THE many parts that women are playing in industry, and those they will be expected to play in the immediate future, are the subject of a long paper presented before the ROYAL SOCIETY OF ARTS in London on January 15th. It began with comparisons with the 1914-18 period, which its author, Miss Caroline Haslett (director of the Electrical Association for Women) considered to be an inevitable precedent, though keeping in mind the many dissimilar circumstances. Then only hasty improvisations were possible; now some preparations seem to be planned and the author has lately been appointed adviser to the Ministry of Labour on women's training.

The necessity of that critical period to mechanise production and reduce operations to the capacity of slightly trained workers willing to become automatons expedited the trend towards ease of manipulation and process simplification, which continued when the production of munitions ceased, causing cheaper female labour to be retained in the newer and lighter industries since established without having had any tradition of male labour.

From knowledge of the earlier struggle and current practice, the nucleus of trained women represented by the Women's Engineering Society (of which the author is president) was in a position of some authority to consider coming events, but the problem was to discover women who were willing to spend their time and money in training. Experience showed that supervisors were much more difficult to find than machinists or labourers, so in launching courses at three London and one Glasgow technical institutes emphasis was laid on the practical side of the work, as it was felt that in engineering particularly a supervisor ought to be able to superintend the actual production.

When the present war effort necessitated fresh arrangements training commenced at the Beaufoy Institute and also at Manchester. The decision of the Ministry of Labour and National Service to take over the scheme in August, 1940, was welcomed, though only the practical part (not supervisory) was continued. The Ministry's task was the dual one of "deskilling" work to the level of "upgraded" workers. A standard scale of allowances applied wherever training was given, with the same allowances for women's dependants as for men's. Wherever convenient men and women would be trained side by side on identical processes (150 technical colleges and 37 government training centres) and there was no upper age limit, provided the trainees could stand the strain. Later selected women would be trained for more skilled work.

The claim to "the rate for the job" in respect of wages was not made solely in the interests of women and was reflected in agreements between the Engineering Employers' Federation and several trade unions, including various sections of the electrical industry.

But that was less than half the tale, for women must be absorbed when trained. They must be "mobile minded" and try to loosen home ties, while employers must avoid pre-judgment and the harsher prejudices, and overcome the fixed idea that women could only do repetition work. Many of them were used to the employment of young girls, but had little experience of older women who were not too old to do skilled work.

Following examples of work women were already doing and of what they might do, Miss Haslett concluded with the suggestion that the general attitude of the community to women's work required revision. For instance the ordinary means of entering engineering employment was barred to women.

Contact Materials

PRINCIPAL causes of the failure of contacts are analysed in detail, and the characteristics of the materials commonly used for making contacts are described, in a paper by Dr. J. C. Chaston (Johnson, Matthey & Co., Ltd.) prepared for the INSTITUTION OF ELECTRICAL ENGINEERS. The author explains how the resistance of light-duty contacts is affected by the size, shape, surface finish and closing pressure; an account is given of the resistance of contact materials to tarnish films, and attention is directed to the effects of dust and grease films in causing failure.

In the case of medium-duty contacts, when arcing occurs the most serious cause of failure is said to be "material transfer," which action takes place when DC is interrupted, tending so to close up the gap that the contacts may finally interlock. Factors that influence such transfer are discussed, limiting currents and rates of building-up being indicated for a number of common contact materials under given test conditions. It appears to be most likely that the limiting conditions which define the commencement of material transfer are not dependent only on the current value, but are influenced to some extent also by the energy in the circuit. Very many more experimental data are required before the conditions can be formulated more exactly.

The choice of contact materials to interrupt heavy DC at high voltages is a matter of considerable difficulty, but the author feels justified in making the following general observations: Among the "noble" metals fine silver appears to resist transfer better than any other, although in some rather narrowly defined conditions (below 1 A with rectified DC at 100 V in a resistance

circuit) platinum may be preferable. If the choice is broadened beyond the noble metals, tungsten becomes valuable, since it resists transfer better than any other metal or alloy but becomes coated in service with a high-resistance oxide film, and the heaviest possible pressures should be used to keep contact resistance as low as possible. Tungsten, moreover, is liable to be brittle, cannot be riveted or cold-worked, and must be attached by copper brazing to a steel base.

The iridium-platinum as well as the ruthenium-platinum alloys generally resist transfer rather better than platinum. The platinum-gold-silver alloys are particularly liable to transfer badly. None of the common silver binary alloys, such as palladium-silver, resists transfer so well as fine silver; but in some conditions more complex alloys appear to be markedly superior. The silver-cadmium-magnesium alloy known as Elkonium 61 has an unusually low rate of transfer with high currents under certain conditions of test.

It has been suggested, the author says, that in this alloy, as well as in the silver-cadmium-nickel alloy known as Elkonium 17, transfer is hindered by cadmium and other oxides which form on the contact surfaces, which have sometimes given rise to trouble through high contact resistance, but it is claimed that a combination of Elkonium 17 as the positive contact with a palladium-silver alloy known as Elkonium 11 as the negative possesses both low rate of transfer and freedom from high-resistance films. It has been used in some railway signal relays and low-voltage regulators in America.

In medium-duty circuits the resistance to transfer of the special composite materials, such as copper-tungsten, silver-molybdenum, and silver-tungsten (including those known as "Elkonites") is not so great as that of tungsten, but is generally rather better than that of silver. The silver-nickel powder metallurgy products (Mallory Metallurgical Products, Ltd.) also show considerable resistance to transfer and in some conditions are among the best materials which have been tested. The constituents of these materials are insoluble in one another, but by a suitable technique can be formed into compacts in which the individual particles remain discrete, finely divided and evenly distributed. They are mainly employed for facing heavy-duty relays and cut-outs, where their arc-resisting and wear-resisting characteristics, combined with their relatively good conductivity, are of value.

Finally the author has measured the inherent tendency of certain contact materials to weld together when the circuit is "made." He also describes a method of testing the wear of unlubricated surfaces (sliding contacts) the results of various metal combinations being tabulated.

Radio Receivers

MAJOR developments in radio circuits which have actually been used for the construction of broadcast receivers during the ten-year period ended 1939 are traced in the paper by Messrs. N. M. Rust, O. E. Keall, J. F. Ramsay and K. R. Sturley (Marconi's Wireless Telegraph Co., Ltd.) which has been released recently by the INSTITUTION OF ELECTRICAL ENGINEERS.

Their analysis is claimed to indicate which circuits have proved to be both economically and technically satisfactory. No attempt is made to deal with small simplified sets or elaborate "de luxe" models. The chief features revealed are the almost complete supersession of the straight radio-frequency set by the superheterodyne and the increase of the number of accessory circuits embodied.

In the past design has been influenced to a great extent by the fact that the market consisted of a large majority of purchasers of first receivers which tended to over-emphasise the accessory circuit (which can be made a good selling point) at the expense of basic design and the potential user's needs. With market saturation approaching, replacements must become a larger proportion of the total sales, and should give the designer an opportunity of producing receivers calculated to fulfil the more exacting requirements of the user.

The paper is intended to assist the designer in taking stock of the present position and is divided into two main sections, dealing with past and probable future developments. Part 1 has been compiled from an examination of over 1,000 circuit diagrams which have stood the test of production. The receiver is analysed stage by stage and the salient features of the circuits are listed separately.

Part 2 is concerned with some fundamentals and the lines of possible development. Selectivity, fidelity, electrical interference and automatic accessory circuits for volume, frequency, selectivity and remote control are some aspects of design to which attention is devoted. After a short discussion on performance specification deficiencies, the predominating influence of transmitter characteristic on the overall selectivity of the complete transmission chain is stressed.

The urge to use other means of broadcasting is being intensified by the technical limitations imposed by the congestion on medium and long waves. The use of carrier-frequency broadcasting over the telephone wires, broadcasting over electricity supply networks, and of audio-frequency relay services, supplemented by audio-frequency distribution direct to the relay stations, should (as they become established and technical difficulties are overcome) help to relieve the congestion. It is doubtful at this stage how far these distribution media are capable of delivering high-fidelity programmes.

Another possible solution is to use "group allocation" of wavelengths (see S. Lemoine, *Experimental Wireless and Wireless Engineer*, 1928, Vol. 5, p. 386). For a given total frequency spectrum allotted to a country, group allocation permits the most economical programme-frequency distribution and goes far towards the elimination of station interference if the conditions for transmitter and receiver design which are set out above are fulfilled.

Immediate general acceptance of the principle is unlikely owing to the special technical problems involved, but future developments along these lines are possible.

I.E.E. Provincial Programmes

THE programme for the second half of the session of the North-Western Centre of the INSTITUTION OF ELECTRICAL ENGINEERS includes a number of interesting papers. The meetings arranged are as follows:—January 25th, "An Objective Noise Meter reading in Phons for Sustained Noises, with special reference to Engineering Plants" by Messrs. A. J. King, R. W. Guelke, C. R. Maguire and R. A. Scott; February 22nd, "Electricity in Paper Mills" by Messrs. W. J. Mason and S. A. G. Emms; March 22nd (joint meeting with the Institution of Post Office Electrical Engineers), "Some Aspects of Line Construction" by Mr. R. M. Chamney; April 19th (annual general meeting), "The Measurement of Lightning Voltage and Currents in South Africa and Nigeria" by Mr. F. R. Perry, and "The Mechanism of the Lightning Discharge and its Effect on Transmission Lines" by Messrs. C. E. R. Bruce and R. H. Golde. The meetings will be held at the Engineer's Club, Manchester, at 2.30 p.m.

The programme of the North-Eastern Centre of the Institution includes the following papers:—January 27th, "Voltage-Operated Earth-Leakage Protection" by Mr. T. C. Gilbert; February 10th, "Electricity in Paper-Making" by Messrs. W. G. Mason and S. A. G. Emms; February 24th, informal discussion—"Impulse Testing" arranged by Messrs. W. D. Horsley, G. W. B. Mitchell and J. A. Harle; March 12th, Faraday Lecture—"Electric Traction" by Mr. C. E. Fairburn (L.M.S. Railway Co.); March 24th (informal) "A.R.P. in the Electrical Industry" by Mr. R. H. Brierly; April 21st, annual meeting. All meetings, except for the Faraday Lecture will be held in Neville Hall (Mining Institute), Newcastle-on-Tyne, at 6.15 p.m. The Faraday Lecture will be held in the Literary and Philosophical Society's Lecture Theatre, Newcastle-on-Tyne, at 6.15 p.m. on March 12th.

Colliery Electricians

THE ASSOCIATION OF MINING ELECTRICAL ENGINEERS (South Wales Branch) held a general meeting at Pontypridd on January 11th, under the chairmanship of the branch president, Mr. C. C. Bleach, and the attendance was the highest for many years. An informal discussion was opened by Mr. B. L. Metcalf, chief electrical engineer, the Powell Duffryn Associated Collieries, Ltd. Subjects dealt with included cable compounds, earthing, the use of malleable iron for cable boxes. A suggestion was made that joint boxes underground should be put into manholes and that the boxes should be covered with stone dust.

The next meeting of the branch will take place in Cardiff on February 8th.

Electrically Driven Ships

A Potential Contribution to the Present Demand for Merchant Tonnage

By A. Regnauld, B.Sc., M.I.E.E.

ALTHOUGH the advantages of the electric drive for the propulsion of ships of almost every type are generally recognised, it must be admitted that this system suffers from the serious disadvantage that the initial cost of the installation is somewhat greater than that of any of the available alternative propulsion systems. In peacetime, contracts for the majority of ships for the Royal Navy as well as for the many diverse types which constitute the merchant service are awarded on a strictly competitive basis, and this operates very severely against the electrically propelled ship. In wartime, however, while the question of capital cost still operates within limits, the demand is for production and ever more production, and anything which may tend to increase the output of tonnage either for the Navy or for the merchant fleet merits very careful consideration.

During the war of 1914–1918, the attempts of the German navy to blockade these islands by the unrestricted use of the submarine presented us with the same vital problem, *viz.*, the rapid production in ever-increasing quantities of every type of ship. The problem was solved, not only by the intensive construction of ships of conventional design, but by the adoption of methods which but for the war would certainly never have been adopted. Thus, we had the so-called "fabricated ship" in which the bridge builders and constructional engineers were pressed into service. At their works, the majority of which were inland, they constructed the various parts of the hull and superstructure, which were sent to some convenient location on the coast, where they were erected and put into the water in the usual way.

The adoption of the electric drive would add substantially to the potential output of machinery for the propulsion of ships and would also increase the output of the shipyards themselves

Even more unorthodox was the "concrete ship" or the reinforced concrete ship as it should have been called, since concrete by itself certainly would not have proved capable of withstanding the complex system of bending and torsional stresses to which the hull of a ship is subjected. Reinforced concrete was generally speaking only used for the construction of small vessels, such as tugs and barges, but these were produced in large numbers and, on the whole, they proved—as did the fabricated ships—fully equal to the duties for which they were designed. The "wooden ship" was also resuscitated, and while this type was not built in Great Britain owing, possibly, to the shortage of timber, a number of cargo ships having wooden hulls was built in the United States, some of them being of the necessary size and strength for the arduous service of the trans-Atlantic routes between American and European ports. Under the conditions of the present war it is hardly possible that we shall see a revival of the concrete ship and with timber in such short supply, we are not likely to see this material used to any great extent.

There is, however, another direction in which it may be possible to increase the output of ships and that is by adopting the principle involved in the construction of the fabricated ships of the previous war and utilising the vast potentiality of the electrical manufacturing industry for the production of the propelling machinery, leaving the shipyards to deal with the construction of the hulls. The majority of the large electrical manufacturing firms in this country have their works situated inland and they are equipped for the construction not only of electrical generators, motors and switchgear, but also of the prime movers, *i.e.*, steam turbines and oil engines, used for driving the generators. Indeed, the design and construction of steam turbines and heavy-oil engines forms, in many instances, an important part of the work undertaken in peacetime.

In present circumstances the manufacture of electrical generating equipment, including the prime mover, is largely in abeyance, particularly as regards units of large and even moderate power, while the boiler manufacturers find themselves in a somewhat similar position. It is suggested, therefore, that if the shipyards could increase the output of hulls, the propelling equipment for the additional vessels thus produced could be constructed in its entirety by the electrical manufacturers and their associated boiler manufacturers when steam turbines are installed. Many of the shipyards have their own marine engineering shops, and where the output of hulls has already reached capacity, it might even be possible to increase that capacity by accelerating the work on the hulls at the expense of the machinery, the output of the latter being made up by machinery supplied by the electrical manufacturing industry.

Since such a policy would involve a consideration of the problem of which types of vessel are best suited to the application of the electrical drive, it will be of advantage to give briefly a general survey of the main features of the electrical system for the propulsion of ships. While a very good case can be made for the electric drive as applied to the various types of war vessels, we are here concerned mainly with cargo carrying vessels, which form the bulk of our merchant tonnage. As indicated by the broad classification of such tonnage under the headings of steamers and motor ships, two distinct types of prime mover are being used for propulsion. The steamer can be further sub-divided into the turbine-driven steamship and that in which the triple-expansion reciprocating engine is used. The latter, although still very extensively employed on cargo ships of small and moderate tonnage—mainly because of its rugged simplicity—does not lend itself to the electric drive and need not be further considered here. The motor ship almost invariably employs the heavy-oil, compression-ignition engine—or the Diesel engine as it is generally termed—as its source of power. This type of prime mover has two points in common with the steam turbine, the first, that its economic speed is greater than that of the propeller and the second, that it cannot be readily reversed. Both of these disadvantages are overcome by the electric drive.

The economic speed of the steam turbine is very high, somewhere in the region of 3000 RPM, according to size, and in all modern turbine-driven steamships some form of speed-reduction gearing must be employed. The Diesel engine is generally designed to run at low speed so that it can be directly coupled to the propeller shaft, but since the most efficient propeller speed for ships of the type under review which usually have a speed of 12 to 15 knots, is about 100 to 120 RPM this means that an engine of large size and excessive weight in relation to the power developed must be employed, both these factors having a very unfavourable influence on the economic operation of the ship.

The ability to use engines having higher speeds of rotation, say, between 500 and 1000 RPM, although it would necessarily involve the use of some form of speed-reduction gearing, would produce a considerable saving both in the weight and the space occupied by the machinery, resulting in an increase in the capacity of the cargo holds for a given size of ship. Thus, the electric drive using a high-speed prime mover direct coupled to a generator, the current from which is fed to a motor direct-coupled to the propeller shaft, can be regarded, first and foremost, as a form of speed reduction gearing, silent in operation, yielding an infinitely flexible coupling and having an overall efficiency only slightly less than that of mechanical gearing.

It has already been mentioned that neither the turbine nor the heavy-oil engine can be readily reversed. In the case of the turbine having mechanical speed-reduction gearing, this involves the use of specially constructed turbines running in the reverse direction to the main turbines, since the powers involved are too great to permit the use of reversing mechanisms in conjunction with the gearing itself. These astern turbines, often of sufficient size to develop more than 50 per cent. of the ahead power, may only be required for half an hour or so at the beginning and end of a voyage when manœuvring out of and into port, this representing a "load factor" of a very low order indeed, to say nothing of the uneconomical effect of the weight

of the ship's astern turbines and the space which they occupy.

With the marine heavy-oil engine, except those of small power in which gearing is employed not dissimilar to that used in a motor car, reversing is effected by the provision of special astern cams on the cam shaft, these being brought under the valve rockers when running astern. With the electric drive, reversing is effected by the use of simple switchgear which alters the connections on the propulsion motors so that in the one case the astern turbines are eliminated and in the other a far simpler engine is obtained. In addition, the reversing process is greatly facilitated by the use of the electric drive, so much so that, if desired, it can be effected directly from the navigating bridge without the intervention of the usual engine room telegraph, a feature which makes for far more efficient manœuvrability. Direct bridge control is, indeed, very widely employed on all kinds of electrically propelled ships in the United States, particularly smaller vessels, such as ferries and tugs which often have to be manœuvred in crowded and narrow waters.

Another distinctive feature of the electrically propelled ship is its high efficiency at all speeds between dead slow and full speed. With the fixed mechanical gearing of the normal turbine-driven steamship and with the direct-coupled Diesel engined vessel, speed regulation is necessarily effected at the engine itself. With both of these prime movers, however, efficiency falls off rapidly on either side of the maximum, which is designed to occur at the normal rated output of the engine. With the electric drive, particularly if two or more generators are employed to supply the maximum power, not only is a very high degree of flexibility obtained but the installation can be so designed that high efficiency is obtained at all the different speeds at which the vessel may be required to run when in service. This feature would prove to be of great value in wartime when vessels may be called upon to proceed in convoy, while the capability of being rapidly manœuvred if bridge control is fitted would obviously prove of supreme value in any emergency which might arise.

Finally, attention may be directed to the superior prospects of electrically propelled vessels after the war is over. Admittedly, the initial capital cost of such ships will be somewhat greater than that of similar vessels fitted with the more usual forms of drive, although it should be recognised that the cost of the machinery is but a portion of the cost of the ship as a whole. But when these vessels are called upon to run on a competitive basis with ships of this and other countries, it will be found that not only will the cost of operation as represented by the charges for fuel, lubricating oil and personnel be considerably less, but the earnings will be greater due to the relatively larger volume and weight of cargo which can be carried. The maintenance charges comprising the cost of overhauls, spares and so on will also prove to be in favour of the electrically propelled ship.

It does therefore appear highly desirable that the possibilities of the electric drive under the particular conditions of the present emergency should be investigated without delay. There can be no doubt but that its adoption would add substantially to the potential output of machinery for the propulsion of ships by utilising the productive capacity of inland manufacturing firms and it would also increase the output of the shipyards themselves since they could concentrate more particularly on the construction and fitting out of hulls. Moreover, apart from the special value of such ships at present when the provision of the maximum amount of tonnage is a matter of vital importance to our war effort, the electrically propelled ships would prove an asset of particular value when the merchant fleets revert to their peacetime services.

NEW BOOKS

Transformers. By Eric E. Wild, B.Sc. Tech., A.M.I.E.E. Pp. 132; illus. Blackie & Son, Ltd., 50, Old Bailey, London, E.C.4. Price 5s.

This is the fourth of a new series of text-books of engineering degree standard, designed to provide a number of low-priced small volumes, each dealing with one particular section of electrical engineering. It covers, in brief but none-the-less informative manner, the elementary principles of the theory, design and operation of transformers with emphasis on the core type of construction and, of course, on units of "every-day" size.

The first two chapters deal with the theory, supported by vector diagrams, of the transformer on no-load and when loaded and it is shown how to calculate the various characteristics such as no-load current and losses, regulation, load losses, and equivalent parameters. Polyphase transformers form the subject of the next chapter, which describes the connections in more common usage. The next four chapters relate to the principles of design and cover the general basis, the iron core, windings and insulation, and cooling arrangements.

The standard proving and acceptance tests for transformers are described in Chapter 8, certain operating features in Chapter 9, and transformers for special purposes in the final chapter. Appendices to the book show the calculation of leakage reactance, and the ratings of rectifier transformers.

As an elementary introductory text for the use of college students and the junior engineer entering industry, the book may be recommended. It is attractively produced and well worth the modest sum at which it is published.—S. A. S.

Chambers Technical Dictionary. Edited by C. F. Tweney and L. E. C. Hughes. Pp. 957. W. & R. Chambers, Ltd., 38, Soho Square, London, W.1. Price 15s.

Much has happened in the development of science and technology since the senior editor of this work brought out, in 1906, his earlier "Technological and Scientific Dictionary." Not only have new technical terms come into being but, due to recent discoveries and progress, the meanings of many technical terms have become modified. No fewer than 161 different subjects relating to various branches of science, engineering, manufactures and construction are covered by the present work, and in electrical engineering due consideration has been given to terms in electrical communication, telephony, radio and television. Particular attention has also been paid to the rapidly developing subject of acoustics.

Definitions are concise and clear, while the method of setting out the individual items permits quick reference. Pronunciations are given where doubt may exist. The comprehensiveness of the dictionary is likely to render it of wide appeal, and the editors and publishers have performed a most useful service by making available such a full and representative cross-section of the language of modern science and technology.—W. R. C.

Experimental Radio Engineering. By E. T. A. Rapson, M.Sc., assisted by E. G. Ackermann. Pp. 143, Figs. 169. Sir Isaac Pitman & Sons, Ltd., 39 Parker Street, London, W.C.2. Price 8s. 6d.

This volume is not a text-book on the subject, but is a collection of eighty experiments and methods of measurement in radio engineering. It is designed to be used in conjunction with a three or four years' course at a technical college. In general style the book resembles the author's earlier publication "Experimental Electrical Engineering," and is stated to be the outcome of the development of instructional courses for students who are engaged in the radio industry.

The experiments are grouped under thirteen main headings, and cover series, parallel and coupled circuits, static characteristics of electron tubes, dynamic constants of valves, characteristics of amplifiers and detectors, thermionic valves as oscillators, audio-frequency measurements, radio-frequency measurements, characteristics of attenuators and filters, radio receiver tests, electro-acoustic tests, and cathode-ray tubes, time-bases and their applications. The radio receiver test section makes use of the specifications issued by the Radio Manufacturers' Association.

It is not intended that the student should necessarily perform the experiments in the order in which they are set out in the book, but rather that the laboratory work should follow the relevant theoretical studies. Nevertheless, the order chosen by the author is entirely logical and sound. In each experiment the procedure is given first, accompanied by a circuit diagram showing where the various measuring instruments are to be connected. The manner of showing or evaluating the results is then given, graphical methods being used wherever possible. Typical curves, and the constants used in obtaining them, are given in practically all cases.

In the final section the student is invited to state various important conclusions which may be drawn from the results, a very necessary exercise if the full benefit of each experiment is to be obtained. The book terminates in a short appendix of useful tables.

It is an admirable publication, supplying the type of instruction in practical work which is very difficult to obtain. The experiments are thoroughly up-to-date in their scope and style.—W. E. M.

Remove the Shackles. By A. G. McGregor. Pp. 204. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, London, W.C.2. Price 5s.

Although an engineer by profession, the author has devoted a great deal of time to the study of economics. In this book he submits a plan, ingenious in its very simplicity, for solving the problem of balancing consuming power and the ever-increasing productive power, and, of more immediate importance, ensuring the maximum war effort with the minimum of burden.

COMMERCIAL AND INDUSTRIAL NEWS

Power Engineers' Salaries. N.Z. Electrical Manufacture. Bradford Vacancies

Power Station Staffs' Salaries

As we state in our leader, the revision of salaries of power station engineers which is operative from January 1st has excluded that part of the rise in the cost of living due to increased taxation. The net adjustment, therefore, amounts to an increase of two points. In making the announcement, the National Joint Board of Employers and Members of Staff (Electricity Supply Industry) stresses the fact that the adjustment is in no sense a "war bonus," but a continuation of a long-established series of adjustments which, during the greater portion of the period since 1923, has produced substantial reductions of salaries. This is illustrated by a statement issued by the Joint Board, showing the effects of the system upon typical salaries during the whole period. It is seen from this that the present salaries are only slightly above those paid in the first quarter of 1925. Since that date there have been substantial reductions. In the latter halves of 1933 and 1934, for instance, a £574 basic salary was reduced to £490 and a £252 salary to £195.

We propose next week to print the new scale in accordance with our customary practice.

Electrical Manufacture in New Zealand

Since the beginning of the war the Trade Commissioner service of the Canadian Government has been energetically examining and reporting upon potential markets for Dominion manufactures, notably electrical goods. In this connection Mr. C. B. Birkett, the Assistant Trade Commissioner at Auckland, recently noted the development which has taken place in this branch of manufacture in New Zealand.

There are now four firms engaged in the manufacture of washing machines, although the motors and wringers are still being imported. A fifth firm, a branch of a well-known Canadian organisation, operates an assembly plant for which nearly all parts are imported, although pressure is being brought on the concern to incorporate more parts of local manufacture. Licences to import parts have been granted in this instance in recognition of the firm's long establishment in the Dominion.

The manufacture of irons, toasters, heaters, kettles, etc., is almost entirely in the hands of one firm which maintains a country-wide distribution and is supplying a steady demand. Refrigerators and cooking ranges are being produced by several firms, most of which are small and still in the initial stages of development.

The Trade Commissioner reports, too, that the manufacture of complete radio sets continues on an increasing scale, and that practically all the parts previously imported are now produced locally. In all departments the industry is fully protected by the import control regulations.

Staff Salaries at Inverness

The Inverness Town Council, which has already adopted recommendations whereby the salaries of the electricity staff are graded, a maximum salary being reached after four years, was informed at its last meeting that the Electricity Committee had conferred with representatives of the Electrical Power Engineers' Association. The latter desired that the council should pay the rates of salary laid down in the National Joint Board schedule. The matter was remitted to the Electricity Sub-Committee for consideration and the Town Council approved this action.

Wash Boilers' New Role

An important attribute of electrical appliances is their adaptability. It is quite a commonplace thing nowadays to find small electric fires being employed for minor cooking operations and even irons are used for this purpose. Last week we referred to the use of electric cookers for heating a dance hall. Much more reasonable is the employment of wash boilers for producing large

A G.E.C. wash boiler providing hot drinks at an Underground station

quantities of tea and coffee or for soup making. The General Electric Co., Ltd., tells us that some hundreds of its wash boilers are serving for these purposes in Underground stations and the company has also supplied a large number of electrically heated hot cupboards for use in these shelters.

The Bradford Appointments

There was a long discussion at a meeting of the Bradford City Council on January 11th when the matter of the title of the new chief official of the Electricity Department came up. The Council originally decided that an "electrical engineer" (not as formerly an "electrical engineer and manager") should be appointed and that there should also be a "commercial manager." At this meeting, however, it adopted a recommendation from the Electricity Committee that the old title should be retained. The chairman of the Committee said that its policy was that there should be a city electrical engineer and manager, a deputy engineer and manager and a commercial manager; the first-named would be the head of the Department and the other two would be responsible to him.

Inadequately Guarded Press

At Oldbury recently the Simplex Electric Co., Ltd., was fined £5, with 5s. costs, on a summons charging it with having an insecurely fenced power press at the Broadwell works. An Inspector of Factories said that the machine was fitted with a guard operated from the crankshaft; this guard had to be disconnected in order to permit access to the tools. It was found that the guard had been disconnected and left so while the machine was in operation.

The company pleaded guilty and said that when it was asked to fit guards some time ago it immediately took steps to do so. Unfortunately the side guards had been left in the stores and the front guard had not been properly connected. The man in charge of the press had been given specific instructions to see to the fitting of the guard but had neglected to do so. Although the company could have escaped liability by bringing the responsible individual before the court it had decided not to do this as the man had now left its employ and it would be hard to trace him. In any event the company did not wish to put the blame on an individual workman.

Eastbourne Contractors' Request

The Eastbourne branch of the Electrical Contractors' Association recently asked the Emergency Committee that the work of installing heating and lighting in public air raid shelters, at present carried out by the Electricity Department, should be allocated among the local contractors. The borough electrical engineer stated that the bulk of the work had now been completed. There were advantages in having the work done by his department. For instance, it avoided the necessity for sending employees of the department to inspect the work while in progress and examine it upon completion, which, with the connection of the meter, would occupy the time of different men for the different types of work.

The Emergency Committee resolved that the secretary of the Eastbourne branch of the E.C.A. should be told that the amount and value of the work was very small, but that the Committee would take advantage of the assistance of local contractors if the necessity should arise.

Temporary Refrigerating Plant

The *Board of Trade Journal* reports that a licence has been issued whereby British Automatic Refrigerators (1936), Ltd., may supply service equipment to any person carrying on a business in which refrigerating machinery or plant is used, during such time as refrigerating machinery or plant belonging to that person is being repaired, reconditioned or replaced. Accordingly, individual licences for this company to supply such equipment in these circumstances will not be required.

Control of Lamp Bulb Exports

The Board of Trade has made the Export of Goods (Control) (No. 3) Order, 1941 (S.R. & O. 1941, No. 46), which came into force on January 23rd. Under the terms of this Order a licence from the Board of Trade will be required to export to any destination a further number of commodities, including ampoules, bulbs and shells for electric lamps and wireless valves.

Export Difficulties

The Institute of Export has circulated to its members a form asking for particulars of difficulties and delays which they have encountered in connection with export business. It is asserted by the Institute that although seven organisations are concerned with the furtherance of export trade that trade is still meeting serious obstacles. The directions in which these problems occur are said to be: Material controls, licensing

departments, inland transport and shipping difficulties, censorship delays to cable and mails, and the heavy cost of insurance and communications.

Scottish Contractors' Year Book

The 1941 edition of the Year Book and Diary of the Electrical Contractors' Association of Scotland (55, Frederick Street, Edinburgh, 3s. net, 3s. 6d. post free) follows closely the arrangement of previous editions. It contains the portraits of the president, Mr. H. M. Spiers, and of the vice-president, branch chairmen, secretary, and consultant and solicitor. In addition to matter of particular interest to members of the Association, there is a great deal of information which will prove useful to Scottish electrical contractors generally. Articles include the Scottish mode of measurement of electrical work, regulations for contracts for building works in Scotland, model conditions of tender, the Central and South of Scotland electricity schemes and some notes on costing for contracting work.

There is an alphabetical list of Scottish electricity supply authorities (both municipal and company), giving particulars of voltages and electricity charges. The directory sections include an alphabetical list, under various towns, of members of the Association, lists of institutions and associations in Great Britain, Scottish contractors on the National Register, architects and surveyors in Scotland and a sectional list of British Standard Specifications. There is also a useful "Where To Buy" guide. Ample diary space is provided at the end of the literary matter.

Diamond Die Control

The Minister of Supply has issued the Control of Diamond Wire-Drawing Dies (No. 1) Order, 1940 (S.R. & O. 1940 No. 2158, price 1d.), which came into force on January 1st. This provides that no person shall produce or acquire mounted or unmounted diamond wire-drawing dies except from the Minister of Supply or under the authority of a licence or special or general direction issued by him, and that no person shall dispose of such dies except to the Minister or to a person who is authorised to acquire under a licence or special or general direction issued by him. Further information may be obtained from the Diamond Die Control, 31 Albert Street, Rugby.

A Works A.R.P. Organisation

Dorman & Smith, Ltd., Manchester, have fifteen "U.U." (Useful Unit) squads consisting of eight to ten men to each squad, on a rota of duty from 2 p.m. one day to 2 p.m. the next. The company provides meals for the men in its canteen, for which they pay a nominal sum, and breakfast is provided free. Should any daylight raids occur, it is the duty of the squads on rota to do the necessary roof spotting and fire watching. The company informs us that during recent raids, the works have undoubtedly been saved by the efforts of the squad on duty who removed several bombs; a reward of £5 is made for every bomb extinguished.

National Certificates and Diplomas

The Institution of Electrical Engineers announces that during 1940 a total of 1,275 national certificates and diplomas in electrical engineering were awarded to candidates in England and Wales and 48 in Scotland. There were 882 unsuccessful candidates. The total is analysed as follows: Ordinary certificates 872, higher certificates 384, higher certificates endorsed 26, ordinary diplomas 33, higher diplomas 8.

Estate Electrician's Death

An inquest was held recently into the death of an estate electrician, George R. Woods, Hamstead Marshall, near Newbury. A night watchman said that on January 3rd, he was asked to look for Mr. Woods who had gone out and had not returned. He found the deceased man in the engine room wedged between the turbine shaft and the wall. He was dead. A police witness said that apparently the jacket which Mr. Woods was wearing had caught in a coupling. To start the turbine it was necessary to go near the shaft to operate a stopcock and there was no guard rail on that part of the shaft. Questioned by an Inspector of Factories, the witness agreed that a cover might have prevented the accident. A verdict of "Accidental death" was recorded.

Trade Announcements

Alfred Graham & Co., Ltd., have removed their works from Woolwich and their office in Westminster to Box Tree Mills, Wheatley, Halifax (telephone: Halifax 5951).

Ensign Lamps, Ltd., announce that pending renewal of service facilities and replacement of stock no further deliveries will be made from the London depot. Orders normally handled by this depot will be dealt with by headquarters or by the Birmingham or Cardiff depots. All correspondence and orders should be addressed to the company at Kent Street Works, Preston.

The Southampton office of Callender's Cable & Construction Co., Ltd., has been closed. The address of the new local office is Upper Brook Street, Winchester.

Baxendale & Co., Ltd., Manchester, announce that from February 1st, showrooms will be at the disposal of customers. Meanwhile they have opened a number of temporary departmental offices in Manchester. That for electrical and radio goods is at 20, Mount Street, Manchester 2.

Dorman & Smith, Ltd., have removed their Glasgow branch to 135, Wellington Street, Glasgow, C.2 (telephone: Douglas 2580). A showroom with stores and offices has been opened under the management of Mr. Mackay.

Flinders (Wholesale), Ltd., state that orders for their Cambridge branch should be forwarded to 14-20, St. Peter's Street, Ipswich.

F. C. Heayberd & Co., Ltd., have removed to 13-14, Walbrook, London, E.C.4 (telephone: City 4510), and ask for manufacturers' current lists.

The London office and stores of Cryselco, Ltd., are now at Thanet House, 231-2, Strand, London, W.C.2 (telephone: Central 1742).

The new address of Maul & Murphy, Ltd., is 3, Inglewood Road, London, N.W.6 (telephone: Hampstead 3938).

Samuel Jones & Co., Ltd., have removed to Peckham Grove, London, S.E.15. Their paper warehouse is at 3a, Upper Thames Street, E.C.4, and the Export Department is operating from 30-34, New Bridge Street, E.C.4.

Whitaker's Almanack

The publication of "Whitaker's Almanack" for 1941 has been delayed by difficulties experienced at home, but now that it is available it will be welcomed by businesses in every sphere. The war has, of course, necessitated many alterations, but while in the national interests certain information has been withheld, most of the features of previous editions have been retained. A new section gives the black-out and lighting-up tables for representative centres in Great Britain and Northern Ireland, while the events of the war are fully chronicled. The various departments set up by the Government for the prosecution of the war are also given. Statistical tables dealing with British and foreign countries include the latest available figures in all cases where publicity will not be of service to the enemy.

The volume contains the usual summaries of literature, science and inventions, etc., and various tables dealing with matters of current interests are interspersed throughout the volume. The publication is published at 15s. (library edition, leather binding), 10s. (complete edition, cloth cover) and 5s. (abridged edition, paper cover). The temporary address of the publishers, J. Whitaker & Sons, Ltd., is care of Sir Isaac Pitman & Sons, Ltd., 39-41, Parker Street, Kingsway, W.C.2.

Calendars

A useful feature of the monthly calendar received from Francis Polden & Co., Ltd., is a movable indicator on a transparent band.

A picture of their "Goblin" overleaping the globe is shown on the calendar, which has monthly sheets, sent us by the British Vacuum Cleaner & Engineering Co., Ltd.

We have received a useful engagement calendar with monthly sheets from W. H. Sugden & Co., Ltd.

"After Trafalgar" is the title of a colourful picture of a gathering outside a country inn, selected by Fitter & Poulton for their calendar for 1941, which has monthly slips showing also the preceding and following months.

The calendar received from Crofts (Engineers) Ltd., has monthly sheets, each of which bears illustrations of some of the company's products.

A young man in overalls makes an effective picture for the calendar of Brittains Electric Motor Co. (formerly Langdon-Davies Electric Motor Co.), which has monthly slips.

Catalogues and Lists

W. Edwards & Co., Ltd., Southwell Road, Loughborough Junction, London, S.E.5.—Illustrated and priced leaflet (MES. 1a) descriptive of the "Vacustat" vacuum gauge.

Nevelin Electric Co., Ltd., Purley Way, Croydon, Surrey.—Liberally illustrated brochure describing the manufacture of glass bulb mercury vapour rectifiers, including many constructional details.

Jackson Electric Stove Co., Ltd., 143, Sloane Street, London, S.W.1.—Priced leaflet illustrating round and corner-fitting shelter heaters.

Johnson & Phillips, Ltd., Charlton, London, S.E.7.—Publications Nos. S.G. 26, 27 and 28, dealing respectively with type SF automatic air break switch-fuse gear, industrial oil circuit-breakers with back-up fuses, and "Eetee" low-voltage h.r.c. fuses which incorporate a striker pin tripping device.

Portable Standard of Brightness

A simple form of gauge for checking low values of illumination is described in BS/ARP 30, which specification has now been followed by BS/ARP 52 describing a simple portable standard of brightness. This is intended to provide a rough check on surfaces, and the nominal brightnesses specified correspond to the values used for various A.R.P. purposes. The general requirements to be satisfied by such a standard are first laid down, and are followed by a description and diagram of a typical instrument complying with these requirements.

In the case of coloured surfaces at low values, such as those met with in A.R.P. work, the brightness which is of importance is the "apparent brightness" of the surface and not the brightness measured on the photopic scale. One of the most interesting and important features of the specification is the appendix explaining what is meant by "apparent brightness" and how it should be measured. Copies of the specification may be obtained from the British Standards Institution, 28, Victoria Street, S.W.1, price 6d., post free 8d.

Change of Name

Perihel Export, Ltd., 10, Cullum Street, London, E.C.3, has changed its name to Perihel, Ltd.

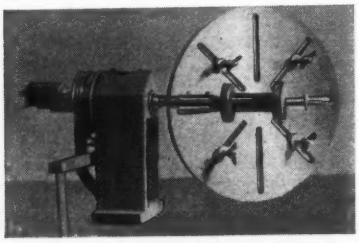
NEW ELECTRICAL PRODUCTS

A Review of Equipment Recently Marketed

Wire Winding Machine

A SIMPLE power driven head for winding wire on to bobbins, or on to formers for field coils, transformers and similar work is offered by F. WHITELEGG, 90, Robinhood Lane, Sutton, Surrey. The spindle is 5/16 in. in diameter and about 6 in. long. It has a fixed knurled cone at the inner end and a smooth movable cone with a quick-grip lock nut at the outer end. Spindles of different dimensions can be supplied if wanted, and users can fit any type of holder on to the stub end of the machine spindle. The faceplate shown is 12 in. in diameter and can be put on the machine spindle instead of the winding spindle, for winding field coils, etc. A 7-in. diameter faceplate can be supplied if preferred.

The drive is by a round belt, of ¼ in. or ⅜ in. diameter, from any motor or transmission shaft fitted with a grooved pulley. The control is by belt tension applied through



Power-driven wire-winding head with 12-in. faceplate

a pedal and tension pulley, combined with a band brake to check the speed when the pedal is released. The pedal rod is adjustable for bench height and is provided with a strong spring.

The power required will depend on the wire sizes, but ¼ or ⅓ HP is suggested. The machine will wind any size of wire from the finest up to about 12 gauge copper. The speed is not limited, but about 1,400 RPM is recommended. The belt can be slipped for lower speeds. The bearings are normally bronze bushed, but ball bearings can be fitted if desired. A large reset counter is usually provided, with three, four or five figures, but can be omitted.

An end support for the winding spindle, of light or heavy type, can be supplied when the coils are heavy or long, or when thick wire has to be strained around a small centre. Other modifications can also be made to suit special requirements.

Flameproof Starter

Recent extensions of the range of flameproof control gear and accessories made by the ELECTRICAL APPARATUS CO., LTD., New Barnes Avenue, St. Albans, Herts., have included an auto-switch with built-in "start" and "stop" push buttons for the direct-on-line starting of small motors. It is a highly standardised article, available at a competitive price. Size "2 B F" is suitable for three-phase motors up to 7.5 HP at 340/650 V and for DC machines up 2 HP at 400/500V. The cast iron enclosure of the standard three-phase model contains a robust triple-pole contactor with no-voltage release and the makers' patent overload and single-phasing preventor.

This starter is not only certified as safe for use in Group I (methane or firedamp) and Group II (petroleum and acetone vapours) but is also covered by a Group III (coke-oven and coal gas) report. Similar certification has been obtained in respect of the type "FPLS" limit switch, which is of the single-pole shunt pattern suitable for severe duty. It is obtainable either in a self-resetting form or not, both open or closed normally.

For starting and stopping automatic control gear in accordance with the fall and rise of pressure up to 220 lb. per sq. in. maximum cut-out value there is a switch that is operated by bellows. This item is built to Groups II and III certification requirements, but it has not yet been submitted for test by the Mines Department.

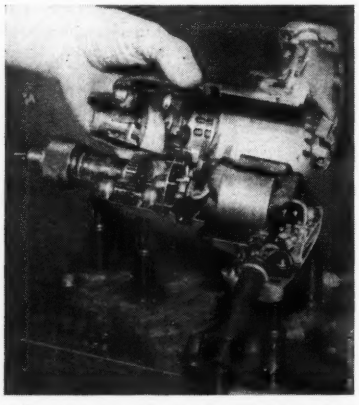
A Vacuum Gauge

As an alternative to inexpensive vacuum gauges of foreign make, W. EDWARDS & CO., LTD., Southwell Road, Loughboro' Junction. London, S.E.5, are about to commence the production of the "Vacustat," which covers the useful range of 10 to 0.01 mm of mercury and is very simple to operate. It is similar in principle to, but differs considerably in construction and method of use from, the usual forms of McLeod gauge. For instance the instrument is only 9 in. high and only about 8 c.c. of mercury is needed.

The gauge remains horizontal during the exhaust period and is simply turned to the vertical position when a reading is desired. This is the only operation necessary, the rotation sufficing to compress the gas, connection being made by rubber tubing. The glass portion of the gauge is mounted on a metal stand.

Light Hand Drills

The latest additions to the range of portable tools listed by S. WOLF & CO., LTD., Pioneer Works, Hanger Lane, London, W.5, are known as "Dartdrills." These ¼-in. and ⅜-in. machines are intended for light duty and will be available for distribution in February. Their general design is unusual in that the interior components are assembled within two half-castings. The bearings are of the self-lubricated type and a ball thrust race is fitted on the drill spindle. The driving motor is of the universal class, suitable for both DC and single-phase AC from 25 to 60 cycles. Standard windings



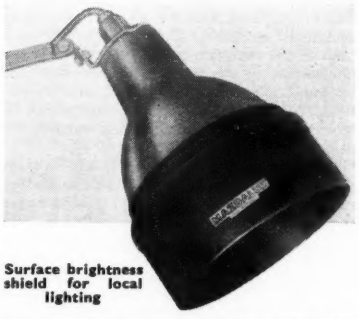
Half-casting assembly of "Dartdrill" for light duty

are obtainable for 50, 100/120, 130, 200/220, or 220/250 V.

The company's maintenance and repair service agents are now available in eighteen towns, an additional service van has been provided for the greater London area and voluntary workers have for some time been running night shifts at the Pioneer Works.

Local Lighting Attachment

Local lighting is sometimes an economical and advantageous method of obtaining the standard of illumination necessary for fine work, or where light is required for gauging operations, but more often than not glitter and direct glare from local lamps defeat



Surface brightness shield for local lighting

any advantage gained by increasing the illumination in this way. The "Mazdalux L.S.B." (low surface brightness) attachment for adjustable arm fittings which has been developed by the Lighting Section of the BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, London, W.C.2, which has exceptional experience of machine tool operations, is intended to reduce glitter and direct glare and thereby to increase clarity and comfort of vision.

The flexible composition skirt shields the eye from direct view of the diffusing screen, which itself is of low brightness. This ensures that no discomfort or interference is caused to other workers in whose direction the light may be accidentally directed. The screen is held in position by a wire spring and may be instantly removed for access to the lamp.

Alexander Bain Centenary

WE mentioned last week that a tablet commemorating the centenary of the birth of Alexander Bain was unveiled on January 11th by Col. H. Carter. At a luncheon which followed the ceremony Mr. D. S. Munro, a former president of the Edinburgh Electrical Society (which, with the Royal Scottish Society of Arts, was responsible for the tablet) said that Bain's greatest discovery related to telegraphy.

In 1846 he patented a simple electric telegraph. In his lifetime Bain had not been rewarded for what led step by step not only to the progress of international commerce but to modern picture transmission and to television.

Dr. G. W. O. Howe, Professor of Electrical Engineering, Glasgow University, related how, when a very fine specimen of Bain's electrical clock was presented to Glasgow University, he (the Professor) had it overhauled. It was now the clock of the Hunterian Museum. To appraise Bain's work it was necessary to realise the meagre electrical background that existed a century ago when Faraday was probing the connection between electricity and magnetism. So regarded, it must be agreed that Bain was a great pioneer.

Professor F. G. Baily said that it was strange that electric clocks took so long to develop. Bain's chemical recorder was very useful in registering any very momentary passage of a current.

ELECTRICITY SUPPLY

Mutual Aid Scheme. Damaged Premises Rebates. Progress at Warrington

Aireborough.—STREET LIGHTING CHARGES.—The Council has informed the Electrical Distribution of Yorkshire, Ltd. that its offer in respect of the non-use of street lighting under the contract is unacceptable, and the Council will make such payments as are considered reasonable by an independent accountant.

Ashton-under-Lyne.—MAINS EXTENSIONS.—The Joint Electricity Board is to lay h.v. mains from Stalybridge substation to Percy Street (Mottram Road) substation, and from Slack Mills to Redfern's Rubber Works; and l.v. mains in Mottram Road, Hyde, near Springs Farm, Stanedge, and Brun Clough Farm, Stanedge.

Batley.—DUPLICATION OF SUPPLY.—The Town Council proposes the duplication of the electricity supply to Hanging Heaton at a cost of £3,292.

Barrow-in-Furness. — DOMESTIC APPLIANCE SALES.—For the duration of the war, new electrical apparatus is to be either sold for cash or by hire-purchase over a period of seven years at the list price plus cost of fixing and plus 6 per cent., free maintenance being given during the period of the hire-purchase agreement.

CHARGES FOR UNINHABITABLE HOUSES.—The fixed quarterly charges under the domestic two-part tariff are to cease for premises damaged and rendered uninhabitable through air raids. Apparatus on hire is to be removed and the charges discontinued.

LOAN.—Sanction has been received to borrow £3,000 for mains and services, £4,000 for substations and £3,000 for meters.

Beddington and Wallington. — SHELTER LIGHTING.—The Emergency Committee is to submit for approval a scheme for lighting shelters, at a cost of £534.

Bedford.—CONTINUOUS METER READING.—The Corporation Electricity Committee reports that in consequence of the present shortage of labour and of the necessity for making the fullest use of available staff, it has approved a proposal for the adoption of continuous meter reading.

Birkenhead. — LOANS. — Sanction has been received by the Electricity Committee to loans of £4,500 for consumers' apparatus and £1,500 for substation equipment.

Bradford.—SUBSTATIONS.—The Electricity Committee is to erect a substation at a cost of £9,940 and increase the capacity of the Holland Street substation at a cost of £1,905.

Cardiff.—LOANS APPROVED.—The Electricity Committee has obtained sanction to borrow £2,000 for substations and re-sanction to £10,000 for buildings.

SHELTER LIGHTING.—The Emergency Committee has approved an estimate of £2,800 for lighting 280 school shelters.

Chester.—STREET LIGHTING EXTENSIONS.—The Town Council is to have installed 130 additional lamps for modified street lighting.

Darlington. — LOAN SANCTIONED. — The Town Council has received sanction to borrow £1,000 for mains and services.

A DEFICIT ANTICIPATED.—The borough electrical engineer has reported to the Town Council that there will be a deficit on the electricity undertaking for the year ending March 31st, 1941, owing to higher costs.

INCREASED CHARGES FOR TROLLEY BUS SUPPLIES.—The charge for electricity for the trolley buses is to be raised from 7-16d. to ¼d. per kWh.

Douglas (I. of M.).—ELECTRICITY BOARD'S ACCOUNT.—The dispute of the Corporation Electricity Committee with the Isle of Man Electricity Board has again been discussed by the Town Council. The Board is stated to owe the Council £5,995 in respect of "adjustments" made in the Board's account at the end of each of the past two years. The basis of the Corporation's charge to the Board has been the subject of a law suit and the matter is still *sub judice*. The chairman of the Electricity Committee expressed the opinion that the only way to obtain the amount said to be due was to sue the Board.

Dunmow.—ELECTRIC PUMPING.—An electric pumping set is to be installed at the Church End pumping station, at an estimated cost of £830.

East Ham.—YEAR'S WORKING.—The report of the Electricity Department (engineer and manager, Mr. W. R. Elliott) for the year ended March 31st last shows that the net income fell by £10,564 to £202,024. The decrease was due to a substantial decline in the sale of high-priced units to shops and business premises; there were increases in the sales to domestic and large power users. The total sales rose by 271,793 kWh to 34,308,734 kWh. The gross profit was £9,002 lower at £53,566, while the final result was a deficit of £4,284 as compared with a net profit of £4,993 in the preceding year.

The report says that alterations in the distribution network in the northern part of the borough made it possible to terminate the bulk supply from West Ham on December 4th, 1939, and to draw the necessary supply from the Central Electricity Board on more favourable terms. The number of consumers increased during the year to 32,939. Of these 9,329 are still on D.C. The supply to 50 consumers was changed over during the year, but for the time being no further change-over work is being carried out. Further progress was made in rental scheme installations and considerable other installation work has been carried out in the form of lighting, power and heating points and wiring for cookers, water heaters and boilers.

Faversham.—SCHOOL SHELTER HEATING.—When the matter of providing electric heating for school shelters was discussed recently by the Town Council reference was made to the difficulty of obtaining materials. The work was urgent as the winter was well advanced. The Council was informed that a Canterbury firm had the necessary materials to enable it to proceed with the work and it was decided to accept this firm's tender of £125 for the work, subject to the approval of the Inspector of Schools.

Finchley. — SHELTER HEATING AND VENTILATING.—The Borough Council is to submit to the County Council for approval a scheme for heating and ventilating air raid shelters by electricity at an estimated cost of £2,000.

Glasgow. — OFFICE INSTALLATION. —The Corporation is to install electric lighting at new registration offices at Hillhead at a cost of £130.

Grimsby.—MUTUAL AID SCHEME.—At a recent meeting of the Electricity Committee the borough electrical engineer (Mr. S. R. Windle) reported that the North-East Midlands Area Committee of the British Electrical Development Association had been promoting the organisation of mutual aid groups by the electricity supply authorities in its area for the purpose of giving assistance in the event of damage due to enemy action. Five groups had already been formed and he had recently attended a meeting at which the formation of such a group for Lincolnshire was discussed. He recommended that the Committee should approve the scheme and this the Committee agreed to do.

Hull.—LOANS SANCTIONED.—The Electricity Committee has obtained sanction to borrow £8,219 for substation equipment and £504 for mains.

Inverness.—FURTHER PROGRESS.—During the past year the energy generated and purchased increased by 891,819 kWh to 6,812,970 kWh, there having been a much greater demand from domestic consumers. The Corporation's hydro-electric stations at Bught and Inshes had a total output of about 740,000 kWh. The department is now taking a partial bulk supply from the Grampian Electricity Supply Co. The net surplus on the undertaking for the year was £654; actually, a deficit had been anticipated.

Jarrow-on-Tyne. — LIGHTING OF BEDE BURN SCHOOL.—The borough engineer is to prepare estimates for the installation of electric lighting at Bede Burn School and first-aid post.

Liverpool.—REBATES FOR DAMAGED PREMISES.—It has been proposed that consideration should be given to consumers who are compelled to use artificial light in their living rooms all day. Mr. P. J. Robinson, city electrical engineer, giving particulars of the proposals which await the confirmation of the City Council, said the consumers on the lighting flat rate would be charged only 1d. per kWh (instead of 3½d.) for electricity used in excess of the consumption for the corresponding period of the previous year. In the case of prepayment meter consumers the rate would be 1½d. per kWh. The rebates would be granted at the discretion of the city electrical engineer and consumers would be advised by meter readers and inspectors to make application for them.

COOKER REBATES SUSPENDED.—Rebates on electric cooker rents to those who have been using cooker for some years, have been suspended by the Electric Power and Lighting Committee. The average increase in other cooker rentals in Liverpool ranges between 6d. and 1s. a quarter, and is intended to cover the increased cost of maintenance and spare parts.

LOAN SANCTIONED.—The Electric Power and Lighting Committee has obtained sanction to borrow £11,000 for expenditure on unspecified substations and equipment and to cover the cost of proposed extensions to generating plant.

London.—CAMBERWELL.—The Emergency Committee has received a circular from the headquarters of the London Civil Defence Region recommending that shelters should be heated by means of a small coal stove, but the Committee is not satisfied that this is the best method. It has adjourned consideration of the proposal until it has had a report on electric heating from the borough engineer.

POPLAR.—Sanction to borrow £679 for substation buildings and £2,684 for apparatus has been obtained by the Borough Council Electricity Committee.

ST. PANCRAS.—The Emergency Committee has approved a scheme prepared by the chief electrical engineer, for equipping shelters on the Council's estates with electric heating installations at a capital cost of £783 and £35 per week for electricity during the winter period.

WALTHAMSTOW.—It is reported that the Borough Council is to make application to the Ministry of Home Security for permission to install electric heating in shelters, the estimated cost being £2,000 a year.

Middlesbrough. — SHELTER INSTALLATIONS.—Approval has been given to the spending of £1,580 for electrical installations in shelters.

Morecambe and Heysham.—SUBSTATION.—The Town Council is seeking sanction to a loan of £3,650 for the erection of a substation.

Newcastle-on-Tyne. — TRACTION SUBSTATION.—The City Council has approved a recommendation by the Transport and Electricity Committee providing for the erection of a substation in connection with the Scotswood Road tram service. This will involve the erection of a building large enough to house two 600-kW units. The total cost of £8,095 will be met from the reserve fund of the Electricity Department.

HOSPITAL INSTALLATION. — The City Council has received sanction to borrow £315 for electrical work in connection with the reconditioning of flat C at the General Hospital.

Scarborough. — LOANS. — The Electricity Committee is seeking sanction to borrow £1,589 for mains and services, £738 for substations and £496 for meters.

Southampton. — DEARER ELECTRICITY. — All electricity consumers except those whose charges are subject to a coal clause adjustment, are to pay 10 per cent. more for their supplies as from the December, 1940, meter reading. This is the first increase in charge since 1935.

Thanet.—AMENDMENT OF ORDER.—Under the Isle of Thanet (Rural) Electric Lighting Order, 1901, the Isle of Thanet Electric Supply Co. is empowered to make a quarterly charge of 11s. 8d. for any amount up to 20 kWh and 7d. per kWh thereafter. The Minister of Transport has made an Order amending this to 10s. for any amount up to 15 kWh and 8d. per kWh thereafter.

Wakefield.—APPLIANCES FOR HIRE.—The Electricity Committee has obtained sanction to borrow £2,000 for the purchase of electrical apparatus for hire.

LIFT FOR TOWN HALL.—The Estates Committee is to install a lift at the town hall at an estimated cost of £750.

Walsall. — EXTENSIONS. — The Corporation Electricity Committee is to extend cables at a cost of £946.

RIPPLE CONTROL SYSTEM.—The Emergency Committee is to purchase 600 portable receiving apparatus in connection with the ripple control warning system at a cost of £1,950.

REPAIRS AT TOWN HALL.—The electrical installation at the town hall is to be repaired at a cost of £150.

Warrington. — INCREASED REVENUE. — Mr. Norman T. Smith, the borough electrical engineer, reports a net profit of £21,919 on the undertaking for the year to March 31st last. Output rose from 58,325,405 to 71,013,735 kWh and revenue from £237,300 to £266,445. A total of 1,339 new consumers was connected bringing the grand total to 30,286. An average of 560.4 kWh was sold per head of the population, as compared with 464.2 kWh in the previous year.

Wolverhampton. — INCREASED CHARGES SUSPENDED.—The Corporation Electricity Committee recommends the suspension of recent increases for the quarter ending March 31st, thus benefiting consumers to the extent of £16,000 to £17,000.

SUPPLY TO HOUSES.—Mains are to be laid at a cost of £586 to supply houses being erected by Bucks and Middlesex Estates at Albrighton.

SHELTER SCHEME ABANDONED. — A proposal for installing electricity for lighting and heating school shelters has been abandoned for the time being in view of the cost, £7,000.

Workington.—PURCHASE OF ELECTRIC VEHICLE.—The Electricity Committee is seeking sanction to borrow £580 for the purchase of an electric vehicle.

Overseas

Canada.—OPPOSITION TO HYDRO-ELECTRIC SCHEME.—Considerable pressure is being exerted by members of Parliament and other interests, but the application of the Calgary Power Company for the right to develop power in the Banff National Park is not faring well, according to reports in Government circles. An important question of policy is involved. The plan of the company for development is large, with a definite wartime angle in that the additional power is sought as a source for the big explosive plant in Alberta. Apart from that, however, is the broader question of a private utility corporation being permitted to develop power in a public park when sites or alternative sources outside the park are claimed to be available. Opponents of the scheme also urge that a vested post-war interest would be created if the application for power for wartime is allowed and that if more is needed it can be generated from Alberta coal and gas. The power sought is at Lake Minnewaka in the park, and it has always been claimed that Spray Lakes were purposely excluded from the boundaries to permit private power development. The Minister of Munitions and Supply, Mr. C. D. Howe, is most anxious for the explosive plant to go ahead and is disposed to help the company in any practicable way.

Eire.—POWER FROM PEAT.—The *Irish Times* reports that three of the six large peat making machines necessary for working the Clonast Bog to provide fuel for the proposed power station at Portarlington are still under construction in Eire. The six machines will provide the 120,000 tons of turf a year which the station will require. Operators are being trained and the bog itself is being drained ready for development. The plant will operate on the lines of similar stations already in existence in Russia and Germany and most of the machinery will have to be imported.

France.—NEW ELECTRIFICATION PLAN.—It was recently announced that the French Government was prepared to spend 6,000 million francs on electrical development. The work to be undertaken includes the construction of hydro-electric plant in the Pyrenees and the Alps, which are expected to employ about 25,000 people. The Government hopes by this to increase electrical production in France by about 45 per cent. bringing the total production to 4,500 million kWh annually. When this work is achieved, or perhaps before, the whole industry will be reviewed with a view to reducing tariffs so that more electrical power may be used in industry.

Further electrification of the railway system is contemplated including the P.L.M line, which, it is expected, will consume 300 million kWh yearly.

Sweden.—NEW POWER PLANT.—The increase in the output of power in Sweden during 1939 was largely due to the starting up of several big new producing units. The first of the sets of turbines and generators, with a capacity of 45,300 kW, was started at the Government-owned Stadsforsen power station on the Indalsælven river. The Laanghagsforsen station on the Dalælven river, constructed and owned by Stora Kopparbergs Bergslags Aktiebolag, put into service the second of its sets, which is of 21,500 kW, while the Hissmoforsen water-power station on the Indalsælven river, owned by Hissmofors Aktiebolag, completed its fourth construction stage with a set of 8,800 kW. Viskans Kraft Aktiebolag completed the harnessing of the Kinna waterfalls on the Viskan river with a 3,500-kW station, and Uddeholms Aktiebolag added 3,100 kW to its Malta station on the Uvaan river, a tributary of the Klarælven river, by a reconstruction scheme.

The difficulty in obtaining coal owing to the war has, of course, helped to hasten the exploitation of water-power resources, and during the past months of 1940 a second set of 45,300 kW at the Stadsforsen station has been completed, together with two sets, totalling 16,200 kW at the Skymnæsforsen station on the Klarælven river, owned by Uddeholms Aktiebolag. It is expected that Hammarforsens Kraft Aktiebolag will be able to complete this year the second stage of the harnessing of the Hammarforsen rapids on the Indalsælven river with a new 26,000-kW set.

Among large constructions of hydro-electric stations in progress at present, the Kommerskollegium report mentions the installation of an eighth set, of 27,000 kW, at the government-owned Porjus station on the Luleælv river. This work will probably be completed next year. Construction is also proceeding at the Hojum station on the Gœtaælv river, not far from Trollhættan, which in its first stage will have a capacity of 70,000 kW, and at the Torpshammar station on the Gimaan river, a tributary of the Ljungan river. At Stockholm a station is being erected on the Jærpstrœmmen, the upper part of the Indalsælven system, and a big station is being built on the Kattstrupeforsen rapids of the Indalsælven river by a company representing mixed government, municipal and private interests.—*Reuter's Trade Service.*

TRANSPORT

London.—NEW UNDERGROUND STATION.—A new low level Underground station was opened to passenger traffic on Sunday, January 19th, at the Highgate station of the London and North-Eastern Railway. It will be served by the "Northern" line electric trains now running from High Barnet and Finchley (Central) to the City and West End. The L.N.E.R. steam train services to the city, via Finsbury, will continue. Interchange escalators have been installed and others will be provided later when more favourable conditions permit. There are four street entrances to the new station.

South Shields.—ANNUAL REPORT.—The report of the transport manager (Mr. H. J. Troughton) for the year ended March 31st, 1940, shows a loss on the trams, trolley buses and motor buses of £2,775 compared with a surplus of £3,793 in the previous year. In addition to the loss, £1,000 had to be spent as a contribution towards the reinstatement of roads and £314 was paid to the Accidents Reserve Fund. Mr. Troughton states that the increased costs were due almost entirely to war conditions. Various steps have been taken to reverse the position in the coming year. Mr. Troughton calls attention to the high cost of electrical energy. In an area where coal was cheap the high price for electricity was not only unusual but unique. During the year electricity costs increased to .964d. per mile compared with .928d. four years ago. During the year the trolley buses carried 15,896,122 passengers, compared with 15,390,269 in 1938-39, and covered 1,208,687 miles (1,238,248 miles). The motor buses carried 3,717,990 passengers (3,197,389) and covered 539,305 miles (519,085 miles). The trams carried 4,035,785 passengers (4,787,926) and covered 274,966 miles (310,311 miles). A slight increase in receipts was more than offset by special expenditure and increased costs.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

8956. "Intercommunication telephone systems." Standard Telephones & Cables, Ltd., and D. G. McKie. March 21st, 1939. (531070.)

12481. "Illuminated signs." T. M. Lewis and M. H. Bebb. June 26th, 1939. (531072.)

14829. "Multi-break gas-blast circuit breakers." Akt.-Ges. Brown, Boveri & Cie. May 27th, 1938. (530971.)

15184. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., A. C. Lane and B. Adkins. May 22nd, 1939. (530874.)

15708. "Thermionic electrode structures." Standard Telephones & Cables, Ltd., and P. Parker. May 26th, 1939. (531076.)

18004. "Inductive load circuits supplied with rectified alternating electric currents." Westinghouse Brake & Signal Co., Ltd., and S. A. Stevens. June 20th, 1939. (531080.)

18106. "Method of and apparatus for indicating and/or preventing excess speed of vehicles." British Thomson-Houston Co., Ltd. (Allgemeine Elektricitäts-Ges.). June 21st, 1939. (530976.)

18170. "Fuse holders." J. A. Crabtree & Co., Ltd., H. F. McLoughlin and W. E. Hill. June 22nd, 1939. (530978.)

18249. "Radio direction finders." Marconi's Wireless Telegraph Co., Ltd. June 30th, 1938. (530979.)

18326. "Electrical heating elements." A. C. Scott. June 23rd, 1939. (530885.)

18360. "Tuning systems for radio receivers." Standard Telephones & Cables, Ltd., W. A. Beatty and E. W. Braendle. June 23rd, 1939. (530886.)

18749. "Alternating-current rectifier apparatus of the dry surface contact type." Westinghouse Brake & Signal Co., Ltd., R. H. Cubitt and L. E. Thompson. June 27th, 1939. (531097.)

19122. "Maximum speed indicators." British Thomson-Houston Co., Ltd., and G. A. Freeman. June 30th, 1939. (530990.)

19499. "Thread plug gauges." British Thomson-Houston Co., Ltd., and C. W. C. Stoodley. July 4th, 1939. (530891.)

19510. "Carrier current signalling systems." Automatic Telephone & Electric Co., Ltd., and T. B. D. Terroni. July 4th, 1939. (530893.)

19574. "Mechanism for the control of electrically driven cranes, hoists or the like." British Thomson-Houston Co., Ltd. July 5th, 1938. (530901.)

19620. "Devices for attaching lamps in reflectors." Philips Lamps, Ltd. July 8th, 1938. (530910.)

19634. "Cathode-ray tube assemblies." General Electric Co., Ltd., and W. H. Peters. July 5th, 1939. (530914.)

19635. "Electric discharge lamps containing luminescent materials." General Electric Co., Ltd. (Patent-Treuhand-Ges. für Elektrische Gluhlampen). July 5th, 1939. (530915.)

19640. "Apparatus for producing high-tension direct current." L. L. de Kramolin. July 6th, 1938. (530917.)

19689. "Methods of sealing electric conductors through a vitreous wall." General Electric Co., Ltd., and R. L. Breadner. July 6th, 1939. (530923.)

19718. "Electric discharge tubes." Quarzlampen Ges. July 6th, 1938. (Cognate application, 19719/39.) (530931.)

19734. "Direct-reading radiogoniometers and measuring apparatus for alternating electrical waves." Soc. Française Radio Electrique. July 6th, 1938. (530935.)

19737. "Electron discharge tube amplifiers." Telefunken Ges. für Drahtlose Telegraphie. July 6th, 1938. (Cognate application 19738/39.) (530936.)

19751. "Circuit arrangements for phase angle compensation." Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. July 6th, 1938. (530937.)

19774. "Oil pressure sensitive signal switch." H. N. Schlaich. July 13th, 1938. (530940.)

19787. "Knitting machines." Electrical Research Products, Inc. July 9th, 1938. (530943.)

19827. "Resistors for electric furnaces." Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey. July 28th, 1938. (530949.)

19829. "Thickness gauges." Westinghouse Electric International Co. July 9th, 1938. (530950.)

19830. "Electric discharge devices." Westinghouse Electric International Co. July 9th, 1938. (530951.)

19841. "Synchronising electric signalling systems by means of repeated impulses." Standard Telephones & Cables, Ltd. July 7th, 1938. (530956.)

19842. "Piezo-electric crystal impedance element." Standard Telephones & Cables, Ltd. September 3rd, 1938 (530957.)

19843. "Wave transmission systems." Standard Telephones & Cables, Ltd., and R. A. Meers. July 7th, 1939. (530958.)

19862. "Combinations of electric discharge lamps with circuit elements for operating them." General Electric Co., Ltd. (Patent-Treuhand-Ges. für Elektrische Glühlampen). July 7th, 1939. (530961.)

19863. "Sources of light for projection apparatus." General Electric Co., Ltd. (Patent-Treuhand-Ges. für Elektrische Gluhlampen). July 7th, 1939. (530962.)

19864. "Electric current converting systems." E. Friedlander. July 7th, 1938. (530963.)

19865. "Enclosed electric switch and fuse units." General Electric Co., Ltd., and H. M. Sims. July 7th, 1939. (530964.)

19868. "Flexible joints for conduits." British Thomson-Houston Co., Ltd. July 7th, 1938. (530965.)

19869. "Insulating materials." British Thomson-Houston Co., Ltd. July 8th, 1938. (530966.)

19871. "Thermal relays." British Thomson-Houston Co., Ltd. July 9th, 1938. (530967.)

19965. "Manufacture of wire." R. Johnson & Nephew, Ltd., W. Robinson and Tilghman's Patent Sand Blast Co., Ltd. July 8th, 1939. (531017.)

19966. "Descaling or cleaning of rod or wire." R. Johnson & Nephew, Ltd., W. Robinson and Tilghman's Patent Sand Blast Co., Ltd. July 8th, 1939. (531018.)

20065. "Braking of asynchronous electric motors." British Thomson-Houston Co., Ltd. July 9th, 1938. (531037.)

20066. "Electromagnetic thickness gauges." British Thomson-Houston Co., Ltd. July 9th, 1938. (531038.)

20164. "Electric distributors for ignition devices." British Thomson-Houston Co., Ltd., and L. Griffiths. July 11th, 1939. (531054.)

20170. "Refrigerators." General Motors Corporation. August 13th, 1938. (531055.)

20173. "Means for mounting electrical accessories." C. L. Arnold, R. W. Dowsett and M. K. Electric, Ltd. July 11th, 1938. (531056.)

20184. "Insulating material." Ardor Engineering Co., Ltd., and G. Richardson. July 11th, 1939. (531059.)

20187. "Radio direction finders." Telefunken Ges. für Drahtlose Telegraphie. July 11th, 1938. (531060.)

20194. "Boiler-feed systems." G. Arrowsmith and Hick, Hargreaves & Co., Ltd. July 11th, 1939. (531062.)

20197. "Caps and sockets for two-ended electric lamps." General Electric Co., Ltd., N. L. Harris and J. W. Ryde. July 11th, 1939. (531063.)

20198. "Lighting systems comprising means for turning high-pressure metal vapour electric discharge lamps on and off from a distant control point." General Electric Co., Ltd., J. Gates and V. J. Francis. July 11th, 1939. (Cognate applications, 20735/39 and 20842/39). (531064.)

20205. "Radio receivers adapted to be tuned to a plurality of predetermined stations by means of push buttons." Philips Lamps, Ltd. July 14th, 1938. (531102.)

20206. "Circuit arrangements for the supply of current to inductive electrical circuits." Patentverwertungs-Ges. Hermes. July 11th, 1938. (531103.)

20208. "Electric signal transmission systems." Standard Telephones & Cables, Ltd. July 13th, 1938. (Addition to 523434). (531104.)

20216. "Washing machine cabinet." W. G. Beatty. July 11th, 1939. (531106.)

20286. "Gas-tight seals whereby electric conductors pass into a vitreous envelope." General Electric Co., Ltd., R. L. Breadner and V. J. Francis. July 12th, 1939. (Cognate application, 5515/40.) (531116.)

20287. "Heavy alloys." General Electric Co., Ltd., and G. H. S. Price. July 12th, 1939. (Addition to 497747.) (531117.)

20309. "Cooling means for refrigerated storage cabinets." Dole Refrigerating Co. December 23rd, 1938. (531121.)

20315. "Electrodynamic oscillation damper." Allmänna Svenska Elektriska Aktiebolaget. July 19th, 1938. (531122.)

20317. "Insulation of electric conductors." British Thomson-Houston Co., Ltd., and R. Newbound. July 12th, 1939. (531123.)

20326. "Electric current measuring devices." Akt.-Ges. Brown, Boveri & Cie. July 13th, 1938. (531127.)

20362. "Method of, and apparatus for, electrically measuring the wall thickness of metal tubing and for controlling the wall thickness." Okonite-Callender Cable Co., Inc., July 12th, 1938. (531134.)

20390. "Setting mechanisms, more particularly for tuning wireless receivers." A. C. Cossor, Ltd., F. A. Jollyman, K. I. Jones and E. L. Parker. July 13th, 1939. (531141.)

20425. "Glazes and enamels." British Thomson-Houston Co., Ltd. July 15th, 1938. (531146.)

20426. "Gyrators for washing machines." British Thomson-Houston Co., Ltd. July 15th, 1938. (531137.)

20427. "Cathode ray tubes." British Thomson-Houston Co., Ltd. July 15th, 1938. (531148.)

20428. "Magnetos." British Thomson-Houston Co., Ltd., and E. H. W. Vickery. July 13th, 1939. (531149.)

(Concluded on next page)

FINANCIAL SECTION

New Companies. Capital Returns. Reports and Dividends. Debenture Charges. Bankruptcies and Liquidations. Stocks and Shares

Reports and Dividends

The Westinghouse Brake & Signal Co., Ltd., reports a net profit for the year to September 30th of £159,781, an increase of £70,849 as compared with the preceding year. General reserve receives £50,000, staff pensions £5,000, reserve for contingencies £25,000 and reserve for investments £13,292. It is proposed to pay a dividend of 10 per cent., less tax (unchanged) and to carry forward £92,384 (against £90,432 brought in).

Drake & Gorham, Ltd., report a gross profit for the year to June 30th of £43,083, as compared with £38,267 for the preceding year. After deducting expenses, fees, debenture interest, &c., there is a net profit of £1,960 (£538). A dividend of 2 per cent. is paid (against nil) and £2,774 is carried forward (against £3,314 brought in).

Dictograph Telephones, Ltd.—Speaking at the annual meeting on January 16th, the Chairman (Mr. P. V. Summer) said that in spite of a most difficult year the directors were able to report a record profit. The demand for loud-speaker installations in factories had increased rapidly during the year; these served many useful purposes. Work in progress at the end of August last was 40 per cent. above that at the corresponding date of 1939 so that the directors faced the future with confidence. Mr. Summer mentioned, however, that the period under review did not cover the intensified aerial attacks which would result in a certain loss of revenue. As we have already reported, the dividend for the year has been raised from 7 to 7½ per cent.

The Anglo-American Telegraph Co., Ltd., has declared a final dividend of £1 10s. per cent. (again making £3 13s. 6d. for the year) on the ordinary stock and a first and final dividend of £1 10s. per cent. on the deferred ordinary (same).

The Electrolytic Zinc Co., of Australasia, is maintaining its interim dividend at 6 per cent.

International Combustion, Ltd., is increasing its final dividend from 12½ per cent. to 15 per cent., but is reducing the cash bonus from 12½ per cent. to 10 per cent., making a total distribution for the year of 30 per cent., less tax (against 32½ per cent.)

Bennis Combustion, Ltd., is again paying an interim dividend of 5 per cent.

Thos. Bolton & Sons, Ltd., have declared an interim dividend of 2½ per cent., as last year.

New Patents (*Continued from page* 289)

20435. "Secret radio or like signalling systems." Marconi's Wireless Telegraph Co., Ltd. August 31st, 1938. (531150.)

20462. "Overload protective electric switches or cut-outs." Licentia Patent-Verwaltungs-Ges. July 13th, 1938. (531156.)

20967. "Television signalling systems." General Electric Co., Ltd., and D. C. Espley. July 19th, 1939. (531159.)

26306. "Electric power cables." Soc. Italiana Pirelli. December 20th, 1938. (531065.)

26792. "Joints for electric cables." Soc. Italiana Pirelli. January 20th, 1939. (531066.)

1940

982. "Methods and apparatus for generating high-frequency electro-magnetic waves." Board of Trustees of Leland Stanford Junior University. April 14th, 1938. (Divided out of 530785.) (531067.)

1518. "Furnace fronts." Babcock & Wilcox, Ltd., and A. R. W. Richardson. June 22nd, 1939. (Divided ont of 518516.) (531166.)

New Companies Registered

H. Tinsley & Co., Ltd.—Private company. Registered January 10th. Capital £10,000. Objects: To acquire the business of H. Tinsley & Co., carried on by C. D. Gall, at Werndee Hall, South Norwood, and to carry on the business of telegraphic and scientific instrument makers and dealers, manufacturers of and dealers in industrial, nautical, aeronautical and physical instruments, meter manufacturers, electrical and chemical engineers, etc. The directors are: C. D. Gall (permanent) and G. F. Gall, both of "Brendon," Blue House Lane, Limpsfield. Registered office: Werndee Hall, South Norwood, S.E.25.

Henry Fisher & Co., Ltd.—Private company. Registered January 3rd. Capital £3,000. Objects: To carry on the business of manufacturers of and dealers in electrical and wireless accessories and instruments, etc. Directors: H. Fisher and Mrs. N. Fisher, both of 52, Tenterden Drive, N.W.4. Registered office: Australia House, Strand, W.C.2.

C. C. Whitney & Co., Ltd.—Private company. Registered January 11th. Capital £300 in shares of 5s. each. Objects: To carry on the business of manufacturers of and dealers in electrical goods, appliances, devices and materials, etc. The permanent directors are: C. C. Whitney, 1, Fairlop Road, E.11, and E. A. Scott, 145, Whipps Cross Road, E.11. Registered office: 1, Fairlop Road, Leytonstone, E.11.

Brighouse Engineering Co., Ltd.—Private company. Registered January 11th. Capital £1,000. Objects: To carry on the business of mechanical, electrical, constructional and general engineers, millwrights, tool makers, iron and brass founders, makers of textile and other machinery, etc. J. Illingworth, 36, High Street, Brighouse, is the first director. Registered office: Widex House, Wakefield Road, Brighouse, Yorks.

Companies' Returns

Statements of Capital

Octron, Ltd.—Capital £3,000 in 2,850 preference shares of £1 and 3,000 ordinary shares of 1s. Return dated January 12th (filed October 9th), 1940. All shares taken up. £3,000 paid. Mortgages and charges: Nil.

Henderson & Priestley, Ltd.—Capital £5,000 in £1 shares. Return dated October 9th, 1940. 2,836 shares taken up. £2,836 paid. Mortgages and charges: Nil.

Cunningham Electrical & Radio, Ltd.—Capital £1,000 in £1 shares. Return dated September 20th, 1940. 800 shares taken up. £800 paid. Mortgages and charges: Nil.

John Baker & Son (Electrical), Ltd.—Capital £600 in 300 preference and 300 ordinary shares of £1 each. Return dated October 1st, 1940. All shares taken up £600 paid. Mortgages and charges: Nil.

Western Telegraph Co., Ltd.—Capital £3,500,000 in £3,118,950 ordinary stock and 38,105 shares of £10 each. Return dated June 5th, 1940. £3,118,950 stock taken up. £2,339,650 paid. £779,300 considered as paid. Mortgages and charges: £818,675.

Wholesale Electric Co., Ltd.—Capital £1,500 in 1,500 shares of £1 each. Return dated July 31st, 1940. All shares taken up. £1,500 paid. Mortgages and charges: Nil.

Public Utilities (Electric), Ltd.—Capital £25,000 in 25,000 shares of £1 each. Return dated August 1st, 1940. All shares taken up. £25,000 paid. Mortgages and charges: Nil.

Receiver Appointed

Cleaver Manufacturing Co., Ltd.—W. F. Alldritt, Sun Insurance Buildings, Bennetts Hill, Birmingham, was appointed receiver and manager on October 9th, 1939, under powers contained in debenture dated September 27th, 1938. Notice dated January 3rd, 1941.

Liquidations

Britannic Electric Cable & Construction Co., Ltd.—Meeting, pursuant to section 236 (2) of the Companies Act 1929, on February 19th, at River Plate House, Finsbury Circus, London, E.C.2. to receive an account of winding-up by the liquidator, Mr. S. R. Hogg.

H. S. Phillips & Co. (Electrical Engineers), Ltd.—Meeting February 14th, at King Edward House, New Street, Birmingham, to receive an account of the winding-up by the liquidator, Mr. F. E. Bendall.

Garnett Electrical Installations, Ltd.—Winding up voluntarily. Liquidator, Mr. H. Beattie, 3, York Street, Manchester, 2.

Power Radiance & Co., Ltd.—Particulars of claims by February 10th to the liquidator, Mr. C. B. Brecknock, 2, King Street, Nottingham.

Bankruptcies

J. F. Creasey, trading as Positive Electric Co., Romford Rd., Manor Park; The Parade, Wanstead Park; and Catherine Road, East Ham, electrical engineer.—This debtor applied for his discharge at the London Bankruptcy Court on January 16th before Mr. Registrar Kean. The Official Receiver reported that the debtor failed in October, 1933, with liabilities of £4,950, and the assets had realised £750. The failure was attributed to losses on a Corporation contract, falling off of business and heavy overhead expenses. The Registrar granted the discharge subject to a suspension of 18 months.

R. Jackson, 5, Romney Avenue, Dalton-in-Furness, lately carrying on business at 38, Whalley Range, Blackburn, electrician.—The public examination was held recently, when a statement of affairs was submitted showing gross liabilities of £2,262 and an estimated surplus of £1,106. The debtor ascribed his failure to shortage of capital and inability to finance a hire-purchase company and to collect book debts. The examination was closed, subject to the signing of the notes.

J. Laycock, electrician, formerly of 67, South Street, Keighley, and now residing

(*Concluded on page* 293)

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets show a gradual expansion of business. It cannot be claimed that any considerable amount of activity is noticeable, but at the same time it can be said that public interest appears to be reviving, with the result that any favourable war news has an immediate effect upon quotations. The Government's policy of keeping down money rates serves to direct capital into gilt-edged securities: the absence of new issues prescribes the area of choice available to the investor in ordinary and preference shares.

Home Railway stocks display more vitality than usual, and in them a mild speculative account has sprung up amongst people who consider that the forthcoming dividend announcements will have a hardening effect upon quotations. Investment and speculative investment securities of most kinds are equally in favour. Out of the 150 given in our price-lists, nearly one third are higher on the week.

A Prevailing Anomaly

For fixed-interest stocks and shares to show marked firmness at the same time that ordinary ("equity") shares are consistently in demand is a departure from conventional economics that puzzles many of the older school. Gilt-edged securities stand at comparatively high figures, and the market disposition is upward. Ordinary shares, too, steadily improve, as our weekly price-tables illustrate. Theoretically, this is illogical and contradictory, for the elements that make for gilt-edged strength are generally considered to be antagonistic to "equity" shares. The explanation of the present-day anomaly lies in the Government policy of cheap money. The Treasury announces that 3 per cent. is the maximum rate it will pay for war borrowing.

This establishes the official standard, and governs the quotation for gilt-edged and fixed-interest stocks of repute. It encourages investment in the securities; it helps to maintain a firm market for them. The other class—ordinary shares with variable dividends—investors buy in order to increase their income on capital of which a large proportion has been subscribed to loans issued during the present war. So far as can be seen, the apparent anomaly is likely to be continued for some time to come—perhaps for "duration" if the Government is able to hold steadfastly to its cheap money policy.

Electricity Supply Shares

The effect of the incessant absorption of electricity supply shares is now plainly marked. In none of the prices quoted overleaf is there a fall to be recorded this week. All the six sections that are dealt with in the list of stocks and shares, contribute a quota of rises. Home electricity supply shares have led the way. From Bournemouth & Poole to Yorkshire Electrics, both groups—London and provincial—bear witness to the manner in which investors have previously denuded the market of its floating supply of stock, and to the continued pressure of the would-be buyer. Individual gains are small: they range from 9d. to 1s. 3d., but they tell by no means the whole of the story. Actually, prices are better, in a number of cases, than the nominal figures indicate.

The principal cry is for ordinary shares, but the preference issues are also in demand, and the supply of these latter is now very meagre. The dealers in the Stock Exchange market, when asked for lists of what they have to offer, are fain to apologise for there being so little choice. As for debenture stocks, the famine in these has been mentioned here too lately for it to require further reference.

Dividend Forecasts

The strength of electricity supply shares is the more noteworthy this week by reason of the sharp fall that has occurred in the £1 units of the Gas, Light & Coke Company. These dropped to 11s. 3d. on the company's announcement of postponement of consideration of the dividends on its preference stocks, and although the opinion is that these dividends will be duly met, some doubt is expressed as to whether the ordinary stock can expect to receive any further distribution other than the already declared by way of an interim dividend. At first, it was thought that this announcement would have a reactionary effect upon the prices of ordinary shares in the electricity supply group, but, in point of fact, they went better, as our lists show. That the London electricity supply companies may reduce their dividends next March has been anticipated, and the prices of the shares in the leading companies reflect its acceptance. In the provincial group, however, quotations are strong, thanks to the idea that similar dividends to those of a year ago will be paid.

Equipment and Manufacturing

Johnson & Phillips at 47s. 6d. are ¼ up: so are British Insulated at 87s. 6d. Automatic Telephones at 45s. are 5s. better. Such shares as Callender's and Henley's retain their last week's rises. General Electrics have hardened to 77s. 6d., Reyrolles to 47s. 6d., Siemens to 20s. Ever Ready ordinary are 1s. higher at 26s. 6d., and Lucas $\frac{1}{16}$ up, at 52s. 6d. Enfield Cables have risen to 50s. These are some of the chief improvements in this week's equipment and manufacturing shares. If currency inflation is likely to come, as some people think inevitable, front-rank industrial shares will be wanted more than ever, because, although E.P.T. will prevent dividend advances for the time being, the after-war prospects will be made to look increasingly attractive.

Dividend and bonus announcements may provide an occasional surprise. International Combustion increases its final dividend to 15 per cent., but the cash bonus is lowered to 10 per cent. This makes, with the interim dividend, 30 per cent. for the year, as against 32½ per cent. Nevertheless the price is 5s. up at 4³, which, on the reduced dividend, gives a yield of £6 17s. per cent. Allowance for inclusion of the dividend in the price will bring up the return to nearly 7 per cent.

Miscellaneous Matters

The strength of Home Railway stocks has already been noticed. The Southern Railway 5 per cent. preference at 87 is 2½ points higher. The company's 5 per cent. preferred stock, which was down to 35 at one time last year, is now 52½. London Passenger Transport prior charges are good, the 5 per cent. "B" stock gaining two points at 106. There has been rather more inquiry for the "C" stock around 33½. A further gain of three points, following upon a rise of equal amount last week, has lifted Cable and Wireless preference to 99½, stock changing hands frequently at 100. Anglo-American Telegraph preferred has at length surmounted par with a rise to 101. Following the Cable and Wireless market, Globe Telegraph & Trust preference advanced to 26s. 3d. There has been a little inquiry for Canadian Marconi shares, and the price is 6d. up at 4s. 6d. British Electric Traction deferred has been changing hands up to 810, and shares in the provincial traction group are generally better on the week. Amongst the overseas issues, Calcutta Electric, at 34s., have gained a florin. Whitehall Investments preference, at 13s. 6d., are again better.

The Lend and Lease Bill

Various proposals are afoot in New York with regard to developments likely to arise out of President Roosevelt's Lend and Lease Bill for assisting this country with munitions. Formation of industrial and investment trusts is one of these suggestions. The idea is that an American trust, or trusts, shall take over British-held American securities and keep them in the United States, buying them either outright or holding them in escrow for the proprietors, the transactions in the latter case, to be settled at the end of the war. Nothing definite has yet been announced, but the proposals are interesting and their outcome will be awaited attentively by many investors on this side who own American securities which have not yet been called up by the British Treasury.

Requisitioned

Under a new Order, the Treasury has called upon holders of a fourth batch of United States securities held by British residents, to hand these over to the Treasury at the prices current in New York on January 11th.

In this latest batch requisition, American Telephone and Telegraph shares figure. They are to be taken over at £41 11s. 6d. sterling per share, ex the dividend due on February 1st. Securities in a large number of American electric lighting and utility companies also appear in the list, such, for instance, as Pennsylvania Water & Power common shares (£13 8s. 6d.); General Cable Corporation 7 per cent. preferred (£21 7s. 7d.); Consolidated Edison Company of New York preferred (£26 12s. 7d.). Holders of the various stocks and bonds have no option as to whether they shall sell or not.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1940 Highest	1940 Lowest	Dividend Previous	Dividend Last	Middle Price Jan. 20	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole	63/6	36/6	15	15	46/3	+⅛	—
British Power and Light	30/-	20/-	7	7	27/6	+1/6	5 1 10
City of London	28/-	20/-	7½	7½	22/-	+9d.	—
Clyde Valley	38/6	24/-	8	8	35/-	+⅛	4 11 5
County of London	43/3	21/-	10½	10½	33/3	+9d.	6 6 4
Edmundson's:							
7% Pref.	32/-	24/3	7	7	28/3	..	4 19 1
Ord.	27/6	18/6	9	6	24/6	+1/-	4 18 0
Elec. Dis. Yorkshire	40/3	32/-	9	9	36/3	+⅛	4 19 4
Elec. Fin. and Securities	42/-	34/6	12½	12½	40/-	..	6 5 0
Elec. Supply Corporation	48/-	39/-	12	11½	37/-	..	6 4 4
Isle of Thanet	16/-	5/6	4	4	6/-	..	—
Lancs Light and Power	33/-	21/6	7½	7½	28/9	..	5 4 4
Llanelly Elec.	21/-	17/-	5½	5½	18/-	..	6 2 5
Lond. Assoc. Electric	21/-	12/6	7	5½	13/9	..	—
London Electric	35/-	19/-	8	7	20/-	..	7 0 0
London Power Deb. Red.	105½	100	5	5	103½	..	4 16 6
Metropolitan	41/6	22/6	12	10	33/9	+⅛	5 18 6
Midland Counties	39/-	23/3	8	8	33/9	+⅛	4 14 10
Mid. Elec. Power	40/-	29/6	9	9	33/9	..	5 6 8
Newcastle Elec.	29/9	22/6	7	7	22/6	..	6 7 3
North Eastern Elec.:							
Ordinary	31/6	16/6	7	7	26/3	+6d.	5 6 9
7% Pref.	32/6	25/6	7	7	30/-	+⅛	4 13 4
Northampton	44/-	38/-	10	10	40/-	..	5 0 0
Notting Hill 6% Pref. (£10)	10¼	9	6	6	9	..	—
Northmet Power:							
Ordinary	42/3	22/6	10	10	33/3	+9d.	—
6% Pref.	29/-	23/-	6	6	27/-	..	4 9 0
Richmond Elec.	24/6	18/-	7	6	18/9	..	—
Scottish Power	38/-	24/-	8	8	34/6	+⅛	4 12 9
Southern Areas	21/3	12/9	5	5	14/6	..	6 18 0
South London	23/3	20/-	7	7	20/-	..	7 0 0
West Devon	20/-	17/6	5	5	20/-	..	5 0 0
West Glos.	22/-	15/-	2½	4½	16/3	..	5 10 10
Yorkshire Elec.	40/-	23/6	8	8	35/-	+6d.	4 11 5
Overseas Electricity Companies							
Atlas Elec.	4/-	1/3	Nil	Nil	1/9	..	—
Calcutta Elec.	37/-	22/6	10*	8*	36/-	+2/-	4 9 0
Cawnpore Elec.	30/-	24/-	10	10	26/3	..	7 12 4
East African Power	25/6	19/6	7	7	22/6	+6d.	6 5 3
Jerusalem Elec.	24/-	15/-	7	7	20/-	..	7 0 0
Kalgoorlie (10/-)	12/6	9/6	7½	7½	11/6	..	6 10 5
Madras	26/9	21/6	8*	6*	25/-	..	—
Montreal Power	35½	30	1½	1½	32	..	—
Palestine Elec. "A"	25/-	10/-	5*	Nil	20/-	..	—
Perak Hydro-electric	20/3	13/-	2½	6	16/3	..	7 7 8
Shawinigan Power	27¼	19	83cts.	90cts.	19	..	—
Tokyo Elec. 6%	69	30	6	6	37	..	16 4 4
Victoria Falls Power	75/9	56/6	15	15	71/3	+⅛	4 4 0
Whitehall Investments Pref.	17/9	8/-	7½	7½	13/6	+6d.	11 2 2
Public Boards							
Central Electricity ·							
1950–70	110½	104	5	5	109	..	4 11 9
1955–75	112½	106	5	5	111	+1	4 10 1
1951–73	107½	102	4½	4½	105	..	4 5 9
1963–93	96½	90	3½	3½	94	..	3 14 6
London Elec. Trans. Ltd.	92	87½	2½	2½	93	..	2 15 9
London & Home Counties							
1955–75	113¼	105	4½	4½	105½	..	4 5 4
Lond. Passenger Transport:							
A	116	104	4½	4½	111½	+1	4 0 9
B	116	102½	5	5	106	+2	4 14 4
C	65¼	25	1½	1½	33	..	4 11 0
West Midland Joint Elec.							
1948–68	106½	103	5	5	105½	..	4 14 9
Telegraph and Telephone							
Anglo-Am. Tel.:							
Pref.	107	85	6	6	101	+1	5 18 10
Def.	23½	18	1½	1½	23½	..	6 7 8
Anglo-Portuguese	22/6	10/-	8	8	15/-	..	10 13 4
Cable & Wireless:							
5½% Pref.	99½	66	4½	5½	99½	+3	5 10 6
Ord.	65	27	4	4	58½	..	6 16 9
Income	99¼	93	..	..	99½	..	4 0 5
Canadian Marconi $1	6/-	4/-	Nil	4cts.	4/6	+6d.	—
Globe Tel. & Tel.:							
Ord.	32/6	21/6	7½*	6*	26/3	..	4 11 5
Pref.	27/9	22/6	6	6	26/3	+⅛	4 11 5
Great Northern Tel. (£10)	20	11	20	20	12½	..	—
Inter. Tel. & Tel.	5½	2½	Nil	Nil	3	..	—
Marconi-Marine	30/-	18/3	10	7½	20/-	..	7 10 0
Oriental Telephone Ord.	2⅞	45/-	12*	11½*	2⅞	..	4 16 10
Telephone Props.	15/-	11/-	6	6	11/3	..	10 13 4
Telephone Rentals (5/-)	9/6	5/3	10	10	7/3	..	6 18 0

Company	1940 Highest	1940 Lowest	Dividend Previous	Dividend Last	Middle Price Jan. 20	Rise or Fall	Yield p.c. £ s. d.
Traction and Transport							
Anglo. Arg. Trams:							
First Pref. (£5)	4/3	1/-	Nil	Nil	2/-	..	—
4% Inc.	11½	2	Nil	Nil	9	..	—
British Electric Traction:							
Def. Ord.	830	400	5	45	800	+50	5 12 6
Pref. Ord.	169	130	8	8	160	..	5 0 0
Bristol Trams	48/6	32/6	10	8*	37/6	..	—
Brazil Traction	12½	5½	$1	50c.	8	+¼	—
Calcutta Trams	24/-	16/3	8	5½	19/-	..	5 15 4
Cape Elec. Trams.	18/6	16/-	5	5	17/-	..	5 17 8
Lancs Transport	35/-	27/6	10	10	35/-	..	5 14 3
Mexican Light:							
1st Bonds	36	25	5	5	35	..	—
Rio 5% Bonds	95	74	5	5	85	..	5 17 8
Southern Rly.:							
5% Prefd.	79	35	5	5	52½	+1	9 10 6
5% Pref.	104½	59	5	5	87	+2½	5 15 0
T. Tilling	45/9	29/-	10	10	41/3	..	4 17 0
Tilling & B.A.	47/6	41/9	9*	8*	44/6	..	—
West Riding	35/-	25/-	10	10	34/6	..	5 16 0
Equipment and Manufacturing							
Aron Electricity Ord.	17/6	10/-	15	Nil	16/-	..	—
Assoc. Elec.:							
Ord.	43/3	26/6	10	10	40/-	..	5 0 0
Pref.	36/6	32/3	8	8	35/-	..	4 11 5
Automatic Telephone & El.	47/3	32/-	12½	12½	45/-	+½	5 11 1
Babcock & Wilcox	50/-	28/6	10	11	42/6	+½	5 13 8
British Aluminium Ord.	56/-	29/-	12½	12½	43/9	+½	—
British Insulated Ord.	92/6	67/-	20	20	87/6	+½	4 11 6
British Thermostat (5/-)	14/9	6/6	18½	18½	11/3	..	8 4 6
British Vacuum Cleaner (5/-)	12/-	4/9	40	12½	6/3	..	10 0 0
Brush Ord.	4/6	1/9	Nil	Nil	3/9	..	—
Callender's	69/-	46/-	15	15	65/-	..	4 12 4
Chloride Elec. Storage	72/6	55/-	15	15	62/6	..	4 16 0
Consolidated Signal	72/6	59/-	36½	17	65/-	+¾	5 4 7
Crabtree (10/-)	24/9	17/6	17½	17½	22/6	..	7 15 7
Crompton Parkinson:							
Ord. (5/-)	20/-	12/-	30	20	17/6	..	5 14 3
E. K. Cole (5/-)	5/-	2/6	10	Nil	4/6	..	—
Elec. & Musical Industries (10/-)	10/3	4/3	5	Nil	7/9	..	—
Electric Construction	36/3	27/6	13½	10	27/6	..	7 5 6
Enfield Cable Ord.	56/-	40/6	25	16½	50/-	+⅛	6 10 0
Electrical Switchgear (10/-)	22/6	20/-	16	10	20/-	..	5 0 0
English Electric	33/9	16/6	10	10	28/9	..	6 13 4
Ensign Lamps (5/-)	15/3	12/6	25	25	15/-	..	8 6 8
Ericsson Tel. (5/-)	39/3	23/-	25*	25*	32/6	..	—
Ever Ready (5/-)	28/3	16/6	30	40	26/-	+1/-	7 11 0
Falk Stadelmann	18/3	12/6	6	7	14/6	..	9 13 2
Ferranti Pref.	25/-	22/-	7	7	23/9	..	5 18 0
G.E.C.:							
Pref.	32/6	26/-	6½	6½	31/3	..	4 3 2
Ord.	83/3	53/3	20	20	77/6	+6d.	5 3 1
Greenwood & Batley	25/6	20/-	15	15	20/-	..	13 0 0
Hall Telephone (10/-)	18/6	8/9	15	10	11/3	..	8 18 0
Henley's (5/-)	21/6	12/6	20	20	20/-	..	5 0 0
4½% Pref.	21/2	20/6	4½	4½	21/3	..	4 4 8
Hopkinsons	46/9	32/6	12½	15	38/3	..	7 16 10
India-Rubber Pref.	21/-	19/6	5½	5½	20/-	..	5 10 0
Intl. Combustion	121/3	70/-	32½	30	4⅜	+¼	6 17 0
J. Lucas	60/6	40/-	15	15	52/6	+⅛	5 14 3
Johnson & Phillips	50/9	32/6	12½	15	47/6	+½	6 6 4
Lancashire Dynamo	59/9	47/6	25	20	47/6	..	8 8 5
Laurence Scott (5/-)	11/-	6/-	15	15	7/-	..	10 14 2
London Elec. Wire	25/6	20/-	7½	7½	22/6	..	6 13 4
Mather & Platt	46/6	30/-	13½	10	34/3	+⅛	5 16 9
Metropolitan Elec. Cable Pf.	22/-	21/3	5½	5½	21/3	..	5 3 6
Murex	86/9	52/6	20	20	80/-	..	5 0 0
Pye Deferred (5/-)	9/-	6/9	25	25	10/0	..	14 5 8
Revo (10/-)	20/9	11/6	17½	5	17/6	..	2 17 6
Reyrolle	60/6	41/-	12½	12½	47/6	+⅛	5 5 2
Siemens Ord.	23/9	15/6	7½	7½	20/-	+⅛	7 10 0
Strand Elec. (5/-)	2/3	9d.	4	2	1/9	..	5 14 4
S. Smith (1/-)	8/-	3/6	37½	50	7/6	..	6 13 4
Switchgear & Cowans (5/-)	11/9	5/6	20	10	7/6	..	6 13 4
Telegraph Condenser (10/-)	8/9	6/3	5	..	7/6	..	—
Telegraph Construction	42/6	29/-	10	10	36/3	+⅛	5 10 6
Telephone Mfg. (5/-)	9/-	5/-	9	9	7/-	..	6 8 7
Tube Investments	96/9	59/-	23¾	23¾	91/3	..	5 5 0
Vactric (5/-)	3/6	2/-	4	Nil	2/3	..	—
Vickers (10/-)	22/-	9/6	10	10	15/9	+6d.	6 7 0
Ward & Goldstone (5/-)	19/9	12/6	20	20	13/9	..	7 5 6
Westinghouse Brake	46/-	30/6	17½	10	40/-	..	5 0 0
Walsall Conduits (4/-)	26/6	17/6	55	55	26/3	..	8 7 8
West, Allen (5/-)	7/-	3/-	7½	10	3/9	..	10 0 0

* Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), Millbank, Westminster, London, S.W.1

Australia. — BRISBANE. — February 6th. City Electric Light Co., Ltd. 415-V, three-phase, 50-cycle, indoor-type, metal-clad switchgear. (T.23623/40.)*

Birkenhead.—February 7th. Electricity Department. E.h.v. metalclad switchgear, etc. (See this issue.)

Eire.—LEITRIM.—February 7th. Board of Health and Public Assistance. Supply delivery, and erection of three pumping units for the Carrick-on-Shannon sewerage scheme, including electric motors, and automatic switchgear. Documents may be obtained from P. H. McCarthy & Son, engineers, 26, Lower Leeson Street, Dublin, or P. J. Haugh, county engineer, The Courthouse, Carrick - on - Shannon. (Deposit: £5 5s.).

Gellygaer.—January 31st. U.D.C. Annual supplies of electrical materials. (See this issue.)

London. — FINSBURY. — January 30th. Borough Council. Two booster pumps for lifting the water supply to service tanks at two baths establishments. Particulars from the Baths Superintendent, Merlin Street Baths, London, W.C.1.

KENSINGTON. — February 6th. Borough Council. Electrical goods (a) cables, flexibles, etc., and (b) conduits, fittings and accessories, for 12 months commencing April 1st. Form of tender from F. Webster, Town Clerk, Town Hall.

New Zealand. — WELLINGTON. — January 29th. Post and Telegraph Department. Condensers, conductor cords and headbands. (T.23413/40.)*

Post and Telegraphs Department. February 6th. Single-core power cable. (T.23550/40.)*

February 4th. Telephone cable. (T.15032/41.)*

South Africa.—PRETORIA.—February 12th. City Council. One or, alternatively two, 18,750-kW turbo-alternators and exciters, with condensing and auxiliary plant. (January 10th.)

February 17th. Ten three-panel l.v. switchboards. (T.15067/41.)*

January 30th. Union Tender & Supplies Board. 200 lighting protectors. (T.23336/40.)*

February 3rd. 73 outdoor-type transformers ranging from 50 to 2,000 kVA. (T.23639/40.)*

February 20th. Electric cooking apparatus and refrigerator. (T.15032/41.)*

CAPE TOWN.—January 28th. Electricity Department. Three oil-immersed single phase 270-kVA transformers. (T.23173/40.)*

January 29th. Air conditioning plant. (T.23387/40.)*

PORT ELIZABETH.—March 13th. Municipality. One battery driven tower wagon and one battery driven van. (T.15013/41.)*

Electric lamps and cable conduit. (T.15014/41.)*

JOHANNESBURG.—Railways and Harbours February 10th. 25,000 yd. lead-sheathed, enamelled and d.c.c. cable; 8,000 yd. p.i.l.c. and armoured twin cable; 21,120 yd. p.i.l.c. and armoured cable, star quad; 2,000 yd. armoured cable lead sheathed, i.r., star quad; and 750 yd. cable, lead sheathed enamelled, silk and cotton covered. (T.15139/41.)*

Southern Rhodesia.—SALISBURY.—March 10th. City Electricity Department. 374 meters of various types. (T.23645/40.)*

March 10th. Electrical distribution material. (T.Y.15136/41.)*

Stores Department. March 28th. Electrically-driven rendering vessel, etc., for municipal abbatoir. (T.15135/41.)*

Stoke-on-Trent.—February 12th. Electricity Department. Mains and cables, e.h.v. sub-station switchgear and transformers. (See this issue.)

Tottenham.—February 14th. Borough Council. Electric lamps, Schedule No. 20. Forms of tender from E. Townson, Town Clerk, Town Hall.

Orders Placed

Blackpool. — Emergency Committee. Accepted. Lighting fittings for shelters. E. Holder & Co.

Cleansing Committee. Accepted. Three batteries for cleansing vehicles.—D. P. Batteries.

Bradford. — Electricity Committee. Recommended. Transformers (revised prices.)—Yorkshire Electric Transformer Co.

Cardiff.—Electricity Committee. Accepted. Transformer spare parts (£135).—Hackbridge Electric Construction Co. Telephone and signalling apparatus (£1,238).—Clifford & Snell.

Great Yarmouth. — Electricity Committee. Accepted. Water screening plant (£1,808).—F. W. Brackett & Co., Ltd.

Lancashire.—Re-wiring electrical installation, installing electric clocks and intercommunication telephones at Bacup and Rawtenstall for Education Committee (£1,491.)—Engineering Service Co., Bolton.

Kidderminster. — Education Committee. Accepted. Heating and lighting apparatus at shelter at Sladen Modern School.—S.W.S. Electric Power Co., Ltd.

London.—ST. PANCRAS.—Replacement of electric vehicle battery (£166, less £14 for old battery).—Edison Swan Electric Co.

Manchester.—Public Health Committee. Accepted. Electric truck.—Greenwood & Batley. Food conveyor and container.—F. Magrini.

South Africa. — CAPETOWN. Electricity Committee. Accepted. Switchgear (£15,138).—A. Reyrolle & Co., Ltd.

Swansea.—Electricity Committee. Accepted. Auxiliary switchgear for turbine (£3,212).—Met.-Vickers Electrical Co.

Walsall.—Public Assistance Committee. Accepted. Electric fires with the necessary wiring in fifteen wards at Beacon Lodge (£460).—Truman Electrical Co.

Windsor.—Town Council. Accepted (subject to the approval of the Minister of Transport). Traffic control signals (£534).—Automatic Telephone & Electric Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aldershot.—Heating scheme for maternity unit; borough engineer, Council Offices, Grosvenor Road.

Ancoats.—Works; G. Brady & Co., Ltd., Collyhurst, Manchester.

Works additions; James Beard, Ltd., 16/20, Great Ancoats Street.

Bethesda.—Sanitary Block for Grammar School for Caernarvonshire E.C.; W. Ll. Jones, county architect, Shirehall Street, Caernarvon.

Blackburn.—Public baths, Short Street and St. Paul's Avenue, for Town Council; W. Pickstone, borough engineer.

Canton Mill, Eleanor Street, acquired for extensions; Henry Walsh (Products), Ltd., Apex Mills, Randel Street.

Bradford. — X ray department, Grassington Emergency Hospital, for City Council; city architect.

Bromsgrove.—Maternity ward, Long Ride, for Birmingham General Hospital Board.

Caernarvon.—Crematorium for T.C.; H. Evans, borough surveyor, Town Hall.

Chesterfield.—Communal feeding and kitchen centres for Rural District Council; J. B. Wikeley, surveyor, Rural Council House, Chesterfield.

Cockermouth.—Houses (220), for R.D.C.; Clerk's office, Grecian Villa.

Financial Section (*Concluded from page 290*)

and carrying on business at "Lochend," Elam Wood Road, Riddlesden, Keighley, Yorks, as Laycock & Ridding.—Trustee, Mr. W. F. Cresswell, 71, Manningham Lane, Bradford, Official Receiver, released January 2nd.

A. Elliott, electrical engineer, 14a, Hargreaves Street, Burnley, and as "Vacs Domestic Appliances," at the Empress Hall, Butterworth Street, Littleborough.— Trustee, Mr. H. S. Haworth, 7, Lord Street West, Blackburn, Official Receiver, released January 4th.

J. S. Griffin, electrical engineer, 108, High Town Road, Luton.—Last day for receiving proofs for dividend January 24th. Trustee, Mr. T. Pollitt 6 The Parade, Northampton, Official Receiver.

J. Stubbs and **J. A. P. Boulton** (John Stubbs & Co.), electrical engineers, 39, Bootham, York.—Trustee, Mr. J. H. Moore, The Red House, Duncombe Place, York, released December 17th.

A. Bremner (deceased), electrical engineer, "Bryneglwys," Newton, Porthcawl.—Last day for receiving proofs for dividend January 29th. Trustee, Mr. R. Betts, 10, St. Mary's Square, Swansea, Official Receiver.

T. P. Wood and **T. George,** trading as T. P. Wood, electrical contractors, 28, Queen Street, Ipswich.—Last day for receiving proofs for dividend January 29th. Trustee Mr. K. E. Fisk, 13a, Great Coleman Street, Ipswich. Official Receiver.

Darlington.—Extensions to machine shops; Darlington Forge and Engineering Co., Ltd.

Canteen and garage, Albert Hill, for H. Williams, Ltd.; Bussey & Armstrong, builders, Brinkburn Road.

Darwen.—Community feeding and kitchen centres for T.C.; E. Marsden, borough engineer, Town Hall.

Doncaster.—Bus station, Glasgow Paddocks, for T.C.; also rest and community feeding centres; R. E. Ford, estates surveyor, 3, Priory Place.

Dukinfield. — Community kitchens and feeding centres for T.C.; E. N. Stannion, borough surveyor.

Gateshead.—Addition to factory for Jayess Clothing Co., Ltd.; Newcombe & Newcombe, architects, 23, Eldon Square, Newcastle.

Three communal feeding centres; F. H. Patterson, Town Hall, Gateshead, borough engineer.

Glasgow.—Fire station, control rooms and station garages (£20,000); feeding centres; workshops, Stow College (£1,070); city engineer.

Houses (842), Cadder estate; housing director.

Crematorium; Scottish Burial Reform and Cremation Society, Ltd.

Halesowen.—Community feeding and kitchen centres, three sites, for T.C.; G. Spurr, borough surveyor, Council House.

Harpurhey.—Works extensions for Reliance Manufacturing Co.; A. B. S. Fryer, architect, 113, Rochdale Road, Middleton.

Hull. — Club, Endyke Lane estate; Y.W.C.A.

Jarrow-on-Tyne.—Feeding centres; J. S. Weir, Town Hall, Jarrow, borough engineer.

Keighley.—Cleansing unit, County Hospital, for West Riding C.C.; county architect, County Hall, Wakefield.

Kettering.—Adaptation of old St. Edward's Church, The Grove, for school premises; R.C. Authorities.

Lancashire.—Alterations to kitchen, Fylde Institution, cookery centre at Burscough, workshops at Accrington and Ashton technical schools; S. Wilkinson, county architect, County Offices, Preston.

Leeds.—Community feeding and kitchen centre, Blenheim Walk Schools (£2,060); W. S. Cameron, city engineer, Civic Hall.

Leominster.—Buildings, Grange Court, for T.C.; town clerk, Municipal Offices, Corn Square.

Liverpool.—Bungalows (1,000) for persons rendered homeless; L. H. Keay, city architect, Blackburn Chambers, Dale Street.

Lower Broughton.—Adaptation of boys' school for Maternity Hospital for Salford Health Committee; W. A. Walker, city engineer, Town Hall, Salford.

Macclesfield.—Houses (62); clerk to R.D.C., 19, King Edward Street, Macclesfield.

Manchester.—Completion of boiler house, power house and fuel store at the College of Technology, for E.C.; Bradshaw, Gass and Hope, architects, 19, Silverwell Street, Bolton.

Alterations to Convent, Rumford Street, for Sisters of Mercy; W. Ellis, architect, Hardshaw Street, St. Helens.

Boiler house for works; Evans, Bellhouse & Co., Ltd., Oldham Road.

Mansfield.—Conversion of Pleasley Hill School into feeding centre, and heating offices, Gilcroft Chambers, for T.C.; W. Thompson, borough engineer, Carr Bank, Mansfield.

Middleton.—Extensions to Town Hall and construction of a strong room, for T.C.; J. Pollard, borough architect, Town Hall.

Morley (Yorks.).—Communal feeding and kitchen centres, for T.C.; F. Turner, B.Sc., borough surveyor, Town Hall.

Nelson. — Municipal laundry for T.C.; A. V. Alexander, borough surveyor.

Newton Heath.—Works additions; Heenan, Beddows and Sturmey, Ltd.

Northants.—Re-equipment of laboratories, Wellingborough, and further school shelters, for C.C.; G. H. Lewin, county architect, County Hall, Northampton.

Poole.—Additions and alterations, administration block, Alderney Isolation Hospital, Ringwood Road, Parkstone, for T.C.; J. R. Barron, borough engineer, Municipal Buildings, Park Gates East.

Rawtenstall.—School feeding centre at Holmefield Works for E.C.; J. Johnson, borough surveyor, Town Hall.

Richmond (Yorks.).—Extension of fire station; H. D. Stanworth, borough engineer, Richmond.

Rochdale.—Extension of the Central Schools' cookery centre for E.C.; S. H. Morgan, borough surveyor, Town Hall.

Public shelters, community feeding and kitchen centres, for T.C.; S. H. Morgan, borough surveyor.

Rubery.—Development of land for houses, Gunners Lane; H. Porritts, Ltd., builders, Eskholme, Ashmead Drive, Ten Ashes, Rednal, Worcs.

Rusholme. — Motor vehicle garage; Hardy's Crown Brewery, Renshaw Street, Hulme.

Sheffield. — New departmental stores, Glossop Road; John Walsh, Ltd., Telephone Buildings, West Street, Sheffield.

Shipley. — Central cooking depot, for U.D.C.; surveyor, Council Offices, Kirkgate.

Southport.—Community feeding and kitchen centres at Birkdale Town Hall, Sussex Road and High Park district for T.C.; H. L. Bunting, borough engineer, Town Hall.

South Shields.—Communal kitchens; N. G. Richardson, Town Hall, South Shields, borough engineer.

Stockton Heath.—Installation of electric lighting in church buildings; Rev. J. Collins, St. Thomas' Vicarage.

Stretford.—Communal feeding and kitchen centres for T.C.; E. Parker, borough engineer.

Tunbridge Wells.—Garage and workshop at rear of Police Station, for Emergency Committee; town clerk, Town Hall.

Wakefield.—Alterations to City Technical College for Cathedral Senior Boys' School Managers; S. G. Wardley, city engineer, Town Hall.

Alterations, 17, Cross Square; Loftus Shoe Co.

Walker-on-Tyne.—Lavatories, etc., at the shipyard; Stephen Easten, Ltd., Westgate Grange, Westgate Road, Newcastle, contractors.

Walsall.—Communal kitchen at Dale Street Methodist Chapel for T.C.; M. E. Habershon, borough surveyor, Council House.

Warrington.—Additions to Ulster Shirt Factory, Long Lane, Longford; J. Burns.

Works additions; C. J. Newton, Ltd.

West Gorton.—Garage and repair workshop, Redgate Lane; Lancashire Freight Services, Ltd., 99, Gt. Jackson Street, West Gorton.

West Hartlepool. — Communal feeding centre at Grayfields, and canteens; F. Durkin, Town Hall, West Hartlepool, borough engineer.

Decontamination laundry for T.C.; W. W. Brazell, builder, Raeburn Street.

West Riding.—Emergency hospital accommodation for C.C. (£180,000); county architect, County Hall, Wakefield.

Wolverhampton. — Works additions; Thos. Rogers & Co.

Offices; C. Attwood & Sons, Ltd., Stafford Street.

Workington.—Houses at Moss Bay for T.C.; A. B. Cooper, borough surveyor, Town Hall.

Works extensions and canteen; Thermal Syndicate, Ltd., Wallsend-on-Tyne.

Wrexham.—Crematorium at cemetery; borough surveyor, 1, Grosvenor Road.

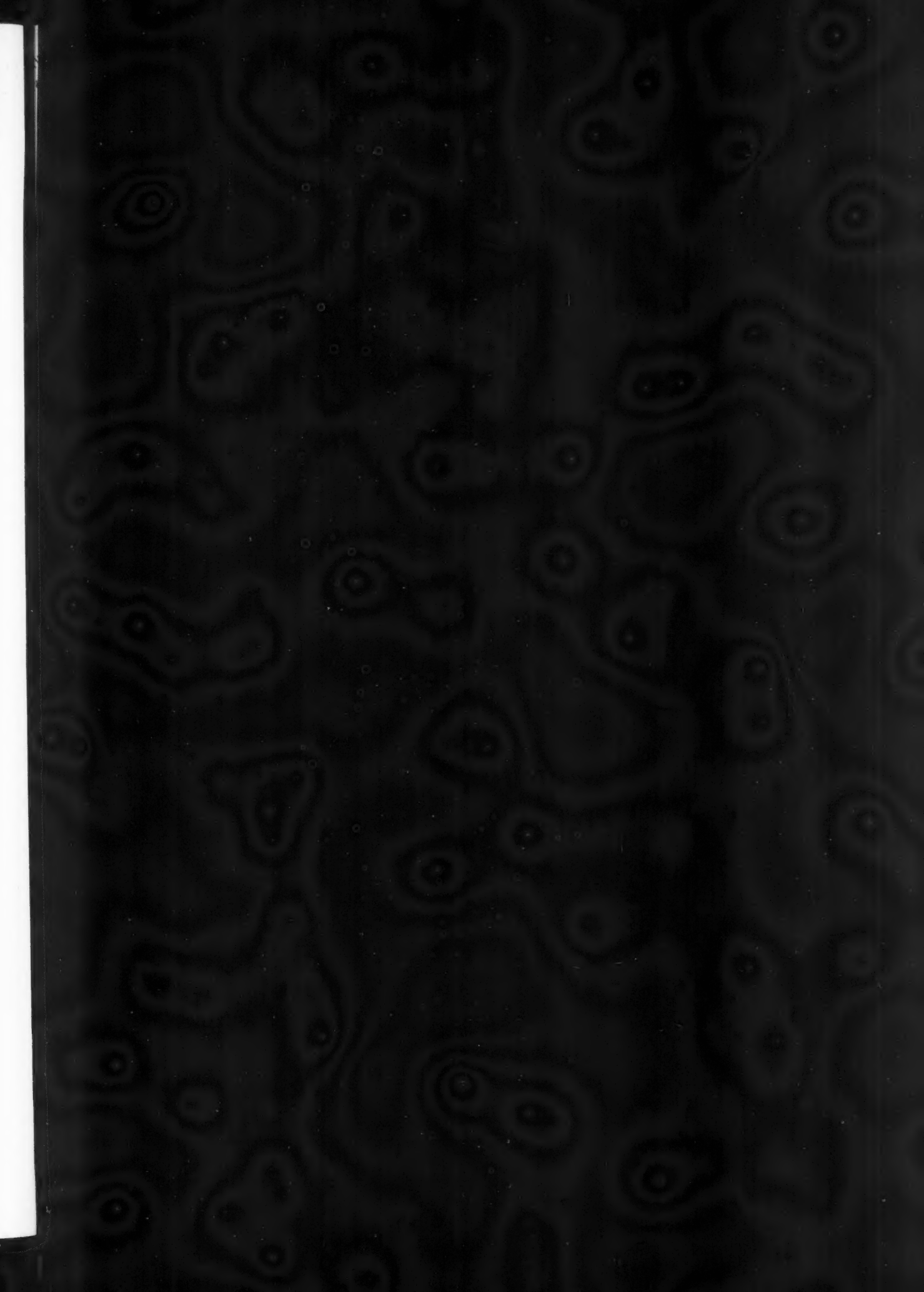
New York Power Exhibition

THE fourteenth National Exposition of Power and Mechanical Engineering, consisting of displays by three hundred engineering and allied companies was recently opened at the Grand Central Palace in New York City. Materials and apparatus for the generation and distribution of power through heat and electricity formed the general subject of the power division of the show. One group of exhibits related to the conduct and control of the combustion process, another to the utilisation of heat, and a third to the construction of the steam generating system with particular attention to the prevention of losses of heat.

Of particular interest is the result of a survey undertaken by International Exposition Incorporated, the organisers of the exhibition. This revealed that utilities have now budgeted for the installation of about £594,000,000 worth of new equipment to meet the increased load required in the mounting production resulting from the defence programme, which has already brought electric power output to new high levels. New devices in the last twenty years have resulted in a sharp drop in the cost of producing power, and the average consumption of primary energy per kWh generated is now equal to 1.30 pounds of coal against 3.36 in 1920.

In the Mechanical Engineering Section, emphasis was on devices designed to increase speed and precision and reduce power consumption. In general, the apparatus exhibited constituted new uses for recently established principles rather than new engineering discoveries. The stress on speed was shown in several devices for saving time, and therefore the cost of both power and labour. Among them was a band-sawing, band-filing and band-polishing machine for sawing through armour plate.

Other interesting devices included several new applications of the photo-electric principle, including extremely high-speed counters that can record movements as fast as 1,000 a second; a device for electronically controlling the level of liquid in tanks; and also electronic telerotors for simplifying telemetering. The advantage of the foregoing apparatus lies in the fact that it is frictionless, thus making it unnecessary to replace parts while also reducing the hazards attendant upon the wearing down of parts which causes lack of precision.—*Reuter's Trade Service.*

Large High-Speed Generator

A 60,000-kW turbo-alternator, which is claimed to have the largest output for any unit yet constructed to run at 3,600-RPM, is now nearing completion. It is being built by the Westinghouse Co. for the Consolidated Edison Co. of New York.